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A SYSTEM OF
GENITO-URINARY DISEASES
SYPHILOLOGY AND DERMATOLOGY.

BY VARIOUS AUTHORS.

EDITED BY

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VOL. II.—PART II.

SYPHILOLOGY.

WITH NUMEROUS ILLUSTRATIONS.

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ulceration of the bladder, in which a number of cases apparently illustrative of gummatous involvement of the vesical walls are recorded. There is, aside from Proksch's article, very little literature of moment on this subject.

III. SYPHILIS OF THE KIDNEY.

Early English writers, among them Gregory and Wells, observed renal disturbances during the course of syphilis. These authors ascribed these disturbances to the action of the mercurials administered for the syphilis, and not to the disease itself. Rayer, however, in 1840, showed that mercurials did not cause kidney disturbances, and asserted that the associated renal troubles were due to the syphilis. These ideas have since that time prevailed. Until quite recently little attention has been paid to syphilis in connection with the kidney, but of late very many careful observations have been recorded, so that at the present time one finds much valuable literature bearing on the subject. The kidney may be attacked by syphilis at any time during the course of the disease, though the nature of the resulting lesions varies much, according as they correspond with the early secondary or late stages. It seems well, therefore, in treating this subject, to subdivide it under two headings, of early secondary and later syphilis of the kidney. Then, again, inherited syphilis may attack the kidney. This subject of kidney involvement from inherited syphilis will be treated later on.

Early Secondary Syphilis of the Kidney.—The attention of the profession was first called to this special condition by Jaccoud in 1864, who in his clinical observations, page 712, records two cases. Perroud, however (*Jour. de Méd. de Lyon*, 1867, p. 115), in 1867 gives the first careful descriptive history, based on two cases which had come under his notice. Since that date many authorities, chiefly French, have recorded similar cases, so that now it is a well-settled fact that the kidneys during the early general invasion of syphilis are subject to attack much in the same way, for instance, as during scarlet fever, although with scarlet fever the kidney complication is much more frequent than with early syphilis. Petersen (*Brit. Med. Jour.*, October 3, 1891), after an apparently quite extended investigation, concludes that the kidney is affected during the secondary period in 3·8 per cent of cases.

The general characteristics of this form of nephritis are usually as follows: It first manifests itself during the second and third months after the development of the chancre in the great majority of instances, though rarely it may occur somewhat earlier or even later than this period. The advent of the trouble is commonly very sudden, there being no prodromal symptoms. It manifests itself by an œdema usually of the face, sometimes of the legs, scrotum, and elsewhere. This œdema oftentimes

extends very rapidly. It may become excessive and be of itself the direct cause of death, as in cases where acute œdema of the lungs develops. Aside from the œdema and its resulting inconveniences there are usually no subjective symptoms.

Oceasionally the patient's attention is directed to an undue frequency of the urinary act, sometimes even before the œdema manifests itself, though it is very rare for any pain to be associated with this frequency. Then, again, there may be feelings of general *malaise*, but as these symptoms are so usually associated with the early stages of syphilis they can hardly be ascribed to the kidney inflammation even when they do exist. Rarely, however, there may be pain in the kidney region on one or both sides, and once in a while sharp, darting pains, which may be severe enough to cause the patient to take to his bed. Headache also has been known to be a feature, as well as disturbances of vision, digestion, etc., such as one might expect to accompany an ordinary acute nephritis. There is one feature, however, which is usually absent in this trouble, although present for the most part to a rather marked degree in ordinary acute nephritis, and that is fever.

From this description it will be seen that the subjective symptoms of acute syphilitic nephritis, aside from the œdema, are as a rule most sluggish and dormant. The signs furnished by careful examinations of the urine at regular intervals are important in this as well as other forms of nephritis. In fact, it is well, as numerous authorities have already pointed out, to examine the urine of all syphilitics, especially during the secondary stage of the disease. The urine in acute syphilitic nephritis, when the disease is on the increase, is small in amount, usually turbid and high-colored, or dark in case sufficient blood is present. There is also considerable albumin, especially if there is much blood. The microscope reveals abundant renal epithelia, blood-corpuscles, granular *débris*, and casts, which are for the most part granular, though some of them may have so many blood-corpuscles and epithelial cells adhering that they pass respectively for blood and epithelial casts.

Negel (Thèse de Paris, 1882) also has called attention to the presence, in a case which he carefully examined, of numerous micrococci. This last fact will be considered again, later on, in classifying this form of nephritis. Then, when this disease is on the decrease, especially in cases where the œdema has been abundant, the urine becomes lighter in color and specific gravity and increased in volume. The sediment, as seen by the microscope, is less, and somewhat changed in character. The blood by degrees decreases and finally disappears, as do also, though more slowly, the epithelial and granular elements.

Hyaline casts gradually, and at last, as resolution approaches, wholly take the place of the granular ones. This process of resolution is not

always continuous, but may be interrupted by numerous relapses. Finally, however, in the majority of cases where proper treatment is adopted, all pathological evidences disappear from the urine, though a faint trace of albumin often lingers, or reappears from time to time long after all other evidences of the preceding attack have disappeared. Occasionally, also, the pathological evidences fail to disappear from the urine. In such cases the acute trouble is the forerunner of a chronic diseased condition. This mishap occurs frequently in cases where treatment has been neglected or not tolerated. In ordinary instances, where proper treatment is applied early in the course of the disease, thorough convalescence is established in from one to three months.

As most of the cases illustrating this form of nephritis recover, it is seldom that the opportunity to make pathological investigations presents itself. Still, enough has been done in this respect to pretty well determine the pathology. Negel (*Thèse de Paris*, 1882), in his excellent thesis, thoroughly considers this point. As a result of the perusal of the pathological literature, the following statement can be made: The kidneys are generally increased in size, and are often described as large, white kidneys. The capsule appears normal, and is not more adherent than it ought to be. On exposing the kidney substance by means of the usual vertical incision, it will be seen that the thickness of the cortical area is considerably increased. It also presents a general grayish appearance, with here and there darker spots, suggesting congestion, together with light-colored streaks. The medullary portion is normal in appearance. Under the microscope the convoluted tubes seem to be the part most affected. The large, straight collecting tubes are often somewhat catarrhal. The tubes of Henle are normal. The epithelial cells of the convoluted tubes are much swollen and granular. Their edges are often obliterated, numerous cells being soldered together as one mass. Then, again, in places the tubes are blocked by the detached masses of epithelia, together with colloid material and blood-cells. The glomeruli often appear normal, though they may be filled with blood or colloid material, or both. There may also be considerable œdema of the connective tissue, due to pressure on the capillaries resulting from the changes in the convoluted tubes. Of course, if the condition thus described persists for a long interval in any marked degree, chronic inflammatory changes in connection with the renal connective tissue would naturally follow.

Bouchard (*Medical Congress*, London, 1881), in 1881, asserted that this form of nephritis bore the same relation to syphilis that scarlatinal nephritis did to scarlet fever; in fact, that it was an infectious nephritis due to direct renal irritation caused by the elimination of the bacteria of syphilis. In 1882 Negel reiterated in his thesis this idea. He also reported finding bacteria in the urine of one of these cases. He further

stated that in the microscopical study of such cases the kidney in the fresh state would show bacteria in the connective-tissue spaces and in the canaliculi. Lecorché and Talamon (La Méd. Moderne, Paris, September 10, 1891) also adopt this theory, that syphilis may affect the kidneys in like manner as many other micro-organismal diseases. This idea now seems to be fairly well established. The general study of acute bacillary nephritis is as yet young, though Mannaberg (Zeitschrift f. klin. Med., Berlin, Bd. xviii, Heft 3, 4) and others, by their investigations, are rapidly making a prominent place for it in medicine.

After what has been said, the question of *diagnosis* in cases of this kind need give little trouble. The sudden œdema would naturally attract attention to the kidneys, and the examination of the urine would verify the previous suspicions. Then the presence of recent syphilis would cause mercurial treatment to be prescribed, which, if properly administered, should soon check the disease and hasten resolution. An acute nephritis from another cause would not be favorably influenced by mercurials. There is a point in connection with the administration of mercurials in these instances which it seems well to mention here, although this article properly does not deal with the question of treatment, and that is, that oftentimes these cases are very quick to show the constitutional effects of mercury in the mouth. Several authors have laid stress on this point. Descoust (Thèse de Paris, 1878) and Negel (Thèse de Paris, 1882) both record cases of mercurial stomatitis, often of a marked degree, following the first administrations of the drug. Petersen (Brit. Med. Jour., October 3, 1891) states that when the gums of syphilitics are readily affected by the administration of mercurials attention should always be directed to the kidneys, with the expectation of finding them more or less involved by the disease.

The *prognosis* should, as has been stated, in this form of trouble be favorable, yet occasionally, even under the most approved treatment, death ensues, and such a result is not unusual when treatment is neglected. When, in addition to this, one considers that every now and then the acute condition is the origin of a chronic nephritis, it would seem to be the part of wisdom to make a somewhat guarded prognosis.

Late Syphilitic Lesions of the Kidney.—Late lesions of the kidneys due to syphilis are not very rare. They are more common than the early ones, which have just been considered. Petersen (Brit. Med. Jour., October 3, 1891) states that 5·8 per cent of patients with late syphilitic manifestations have associated disease of the kidney. The same author found kidney lesions 34 times out of 788 autopsies in subjects where a previous history of syphilis existed; and in 36 cases where the results of syphilis were the cause of death, 7 yielded to chronic nephritis. Mauriac (Rev. de Thérapie., Méd. Chir., February 15, 1889) asserts

that syphilitic renal changes stand in the fifth or sixth place in the order of visceral syphilis.

These lesions give rise to symptoms such as are usually associated with chronic renal disease. The symptoms vary according to the exact pathology of the existing lesion, though there is nothing peculiar to syphilis in contradistinction to other causes by which to distinguish them.

The pathology of these lesions is interesting. It does not consist of one process producing a uniform series of appearances, but of three separate ones, namely, amyloid degeneration, chronic inflammation of the interstitial tissues, and gummatous formation. Fatty parenchymatous changes are also often associated especially with the amyloid degeneration; but as these fatty parenchymatous degenerations are subsequent to and apparently dependent on one of the three processes just alluded to, rather than the syphilis, it has hardly seemed correct to classify them among the changes due directly to syphilis. It is not customary to find one of these first two processes existing in a given case to the total exclusion of the other, as they seem to occur in most instances associated sometimes quite equally, while at other times one or the other of them predominates in varying degrees. Jaccoud (*Gaz. des Hôpitaux*, October 23, 1888) states that amyloid degeneration is more frequent than interstitial inflammation in connection with the kidneys in late syphilis, he having found it in thirty-five out of forty-two cases. Bamberger (*Volkman's Samml. klin. Vortr.*, 1879, No. 173), in forty-nine examinations, found amyloid degeneration the feature in twenty-nine cases and interstitial inflammation in sixteen. Mauriac (*Rev. de Thérapeutique Méd.-Chir.*, February 15, 1889), however, asserts that the interstitial inflammation is the more common. The question is, therefore, not satisfactorily settled. Some pathologists also hold that a kidney which at first was amyloid eventually may become interstitially contracted, having lost most of its amyloid elements, or, in other words, that the interstitial process may be a stage of syphilitic development later than the amyloid.

Gummatous changes in this connection are much rarer, apparently, than the other two. They represent frequently the latest stage of syphilis. They are, however, always associated with interstitial inflammatory changes, and the site of a previous gumma is marked by a firm cicatrix formed by the associated interstitial inflammation.

When amyloid degeneration is the lesion involving the kidney, that organ is of the large white variety often called lardaceous, especially when there is much fatty parenchymatous degeneration associated. It has previously been stated that the kidney, when affected by early syphilis, is increased in size, and is frequently described as a large white kidney. In this acute condition, however, the organ is not lardaceous, but quite nearly resembles the condition of cloudy swelling, with which we are all

so familiar, occurring after some infectious condition, as, for instance, typhoid fever.

The urine in cases of amyloid degeneration is usually but little increased in volume at any time, and it is often quite scant. It contains, besides, considerable albumin, hyaline and waxy casts, with, in many cases, fatty degenerated cells and free fat-globules. When chronic interstitial inflammation is the principal lesion, the kidney is small, hard, and knobbed with a dense adherent capsule. The volume of urine is increased, often to a considerable extent. The specific gravity is very light. There is present but little albumin, at times only a small trace. The sediment is slight, and consists of a stray hyaline cast.

Between these two extreme conditions just described the kidney may present many varying appearances when affected in unison by these two chronic syphilitic processes, according to the proportions in which they exist in any given instance. When extensive amyloid degeneration involves one kidney, the other organ is affected apparently in like manner, though it may be to a less degree. This same statement, however, when applied to chronic interstitial syphilitic nephritis, though true for the great majority of cases, still has exceptions. In other words, one kidney may be rendered valueless by this atrophic condition while the other is spared. In most instances of the kind the sound kidney undergoes a compensatory hypertrophic change. Wagner (*Morbus Brightii*, 1882) records six cases apparently illustrative of this condition, and Weigert (*Volkm. Samml. kl. Vortr.*, 1879, Nos. 162, 163, 326) two. I myself have seen one case which seemed to be of this nature.

James Israel (*Deut. med. Woch.*, January 7, 1892) also records an extremely interesting case of this description, where the offending kidney was removed, the patient making a good recovery. This case will be considered again later on. In Israel's case, however, the affected organ had not at the time of operation reached the stage of atrophy such as has usually been observed at autopsy. In some of these cases, where a unilateral atrophy of the kidney exists the early pathological process is probably partially gummatous, rather than a pure and simple chronic interstitial inflammation.

Frerichs (*Die Bright'sche Nierenkrankh. und deren Behandlung*, Braunschweig, 1851) and some others have held that the amyloid degenerative change found in connection with the kidneys of individuals who have suffered from syphilis bear no direct relation to the syphilis itself. They declare that amyloid degeneration results only from a state of general cachexia, and that when syphilis or any other chronic disease so reduces the system as to bring about this general condition, then amyloid degeneration will result. This theory, however, has been shown not to hold good, at least in very many cases, for oftentimes this form of trouble

is found in syphilitics who have always been most healthy and vigorous. In such cases the amyloid degeneration may not be a general process attacking all the viscera, but localized in the kidneys or some other organs.

Gumma of the kidney is somewhat rare, as has been stated. Jaccoud (*Gaz. des Hôpitaux*, October 23, 1888) reports it seven times out of forty-two cases of late syphilitic disease of the kidney. Most authorities, however, consider this complication much less frequent than the figures of Jaccoud would lead one to suspect. It is generally localized in one organ, though it is not usual for both to be attacked. In most instances this form of trouble had not been suspected during life, there oftentimes being no subjective symptoms and nothing in the urine to attract the attention, at least of the ordinary observer, the autopsy first of all revealing the presence of the lesion. On account of this dearth of symptoms, it may be that gumma of the kidneys is more common than it is at present generally supposed to be. In cases, however, where the disease is extensive, where it is associated with much interstitial inflammation, and where it involves the pyramidal portion of the kidney, the urine does not remain normal, but shows some albumin together with granular detritus, hyaline and granular casts, some renal epithelia and stray pus-corpuscles. There may also exist localized subjective symptoms, very rarely marked in character, as occurred in the case recorded by Israel (*Deutsche med. Woeh.*, January 7, 1892), where an extensive gumma of the kidney pointed externally, and on being incised discharged itself through the flank, leaving a permanent sinus. Of course, where the kidney structure is extensively involved bilaterally by this pathological process there would result general disturbances, such as one ordinarily sees in cases where the excretory function of the kidneys is at fault.

According to Cornil, gummata occupy commonly either the cortical substance of the kidney or the pyramids, rarely both situations in a given instance. They appear as pale-yellow nodules, sometimes no larger than the head of a pin, commonly about the size of a pea, though one may be large enough, as in Israel's case, to be felt externally as a good-sized tumor. They are usually multiple, Cornil having observed as many as twenty, and Axel Key eighty, in connection with a single kidney. In such instances the kidney presents a mottled appearance. If the process continues unchecked, adjacent gummata tend to coalesce by involving the intervening tissues. In this manner considerable areas of surface become destroyed. It has already been stated that interstitial inflammation is associated with the gumma. This inflammation, however, need not be in this instance a general process involving the whole organ, as it ordinarily does, but it usually occurs localized about the periphery of the gumma. One does not expect to find amyloid degeneration associated with a gummatus condition; still, such a combination may occur, Cornil

in his thesis of 1864 having recorded it. In cases where a gummatous process which has been extensive, finally ends in cicatrization, there may be left a portion of the kidney which remains healthy and functionally active. Key (*Hygiea Forh.*, 1877, p. 85) has observed such an instance, the lower portions of both kidneys being atrophied as a result of previous gummata, there being at the time of death an active process in connection with the wall of the heart. In Israel's case, also, already referred to, the kidney at the time of removal showed a gummatous condition of the lower part only in which atrophic changes were commencing.

Wagner refers to an acute nephritis which sometimes grafts itself on kidneys already affected by chronic disease due to previous syphilis. Such a condition of affairs he considers very serious. Out of eight cases observed, five resulted fatally. In the fatal cases, where an examination of the kidneys was afterward made, an acute congestion with a marked hæmorrhagic tendency was found complicating the chronic condition. The cases in which recovery occurred gradually reverted to their former condition.

It has not seemed necessary in this article to describe minutely the chronic pathological processes which attack the kidney as the result of late syphilis, since such a description can be found in all works on general pathology.

Prognosis.—As regards prognosis, the chronic interstitial inflammation is the worst. It can not be influenced to any extent by treatment, and in all cases where it is general, involving both kidneys, the result is eventually fatal, though the period taken to accomplish this may be considerable. The prognosis in the case of amyloid degeneration of the kidneys, although grave, can still be hopeful, provided the amount of associated interstitial inflammation is slight, for under judicious antisymphilitic treatment at times the amyloid material seems to disappear, leaving little or no trace of its former existence. This process of resolution from an amyloid condition is, however, at best a slow one. The gummatous condition allows of a better prognosis than the other two, since it is in most instances a localized process, and nowadays it is well known that individuals get along very well indeed after the loss of half their urinary secreting tissues. Gummatous deposits in the kidney, as elsewhere, gradually melt away and disappear under the proper medication, the only difficulty being that in many cases they do not give enough evidence of their existence to occasion the administration of the required treatment.

I think well of mentioning here somewhat in detail the article of James Israel, several references to which have already been made, since it offers numerous unique features. The histories of two cases are given, in both of which nephrectomy was resorted to, owing to subjective symptoms and enlargement in connection with the kidney. Both individuals

had a history of previous syphilis, and in the case of both the removed organs it was found that chronic syphilitic processes were the cause of all the trouble, and consequently, had a sufficiently prolonged and thorough antisyphilitic treatment, as the author acknowledges, been resorted to, operative measures would in all probability not have been required.

In the first case a large, rather nonsensitive tumor existed on one side, evidently connected with the kidney, since the urine showed inflammatory disturbances, and manipulation of the mass largely increased the sediment in the urine and caused some blood to appear there also. Deep, firm pressure on the tumor was marked by a corresponding indentation, which persisted for a time. Although the patient was improving and the tumor getting smaller under antisyphilitic treatment, still nephrectomy was performed and the tumor removed. This was found to consist externally of a hard, chronically inflamed swollen mass of perinephritic connective tissue highly cedematous. The capsule of the kidney also was involved in this same chronic process. It was this perirenal inflammation which made up the bulk of the tumor, for the kidney itself was not found to be enlarged, but rather atrophied, and presenting a condition of chronic interstitial nephritis. The remaining kidney must have been perfectly healthy, as the patient was entirely cured by the operation. This case is not only clinically interesting, but also pathologically, owing to the fact that the syphilitic process attacked the perirenal structures—a new feature, and one which has not been before observed, at least prominently, to my knowledge. Whether these perirenal structures were attacked primarily or subsequently to the kidney would be an interesting question.

The second case, when it came under the author's notice, presented a fistulous opening in the left flank, which evidently connected with the kidney. There had previously been a history of a fluctuating tumor in that region which had gradually worked its way toward the surface. It had then been incised, the diagnosis being abscess of the kidney. Israel performed nephrectomy, and discovered the remains of an extensive gumma which occupied the lower portion of the kidney. The patient made a good recovery. If this tumor had not been incised it would eventually have discharged of its own accord through an opening in the flank. It is easy to imagine other similar extensive gummata of the kidney which might, like extensive abscesses of the part, discharge themselves into the bowel or the thoracic cavity, though no one has yet, to my knowledge, recorded such instances.

HEREDITARY RENAL SYPHILIS.

Syphilis, when at all active in one or both of the parents, is, as is well known, very fatal to infants, a large percentage of those which are born alive dying about the time of birth or shortly afterward from the effects of

the disease on the vital organs. Jullien (*Rev. Mensuelle des Mal. de l'Enfance*, Paris, July, 1891) relates the histories of two hundred and six cases of pregnancy contaminated by syphilis more or less active, and calls attention to the great mortality. Many pathologists, among them Klebs, Virchow, and Lancereaux, have found, on post-mortem examination in some of these cases, disease of the kidneys, together, generally, with disease in connection with other organs. It is not probable, therefore, that syphilis in such instances confines itself very strictly to one organ, but is rather general in its determinations.

Pathologists still have much work to do in this field, as most of the ideas are based on gross pathology. In some cases, where, from the symptoms during life, there was reason to suspect that the kidneys would be found involved, these organs to the naked eye have presented no special lesion. Then, again, when abnormal appearances are presented, these appearances do not seem to be very uniform. Klebs states that it is common under such conditions to find the kidneys pale and firm, presenting evidences of interstitial inflammation. Virchow has seen such kidneys enlarged, friable, light yellow in color, and dotted in places with reddish and brownish spots, indicative of former hæmorrhages. Such a description would lead one to suspect a large element of fatty degeneration. Lancereaux is inclined to think that a granular degeneration of the epithelial cells of the convoluted tubes is an important feature.

In all probability, if sufficiently prolonged investigations were made in this field, all the pathological evidences which we have already considered in reference to the kidney in connection with the acquired form of the disease, from the acute bacillary nephritis to the gumma, would be found in these infantile cases. If the kidneys, in cases of inherited syphilis, are attacked later in life, it is usually before puberty. In such instances one expects to find a condition of amyloid degeneration.

SYPHILIS OF THE NERVOUS SYSTEM.

By B. SACHS, M. D.

Introduction.—Syphilitic infection is a most potent factor in the development of many acute and chronic disorders of the nervous system. The late manifestations of syphilis are exhibited as frequently in the nervous system as they are in the eye, the liver, or the osseous system. There is good reason to believe that the syphilitic diseases of the nervous system are steadily increasing. This is due not to an actual increase of syphilis in general, but to the more frequent association of syphilis with other potent factors in the causation of nervous disease—namely, excessive work, worry, and the alcoholic habit. The co-operation of several causes is often overlooked.

It is quite useless to enter upon a discussion as to the secondary or tertiary character of syphilis of the nervous system. It is a late development of constitutional syphilis, and that is sufficient. These syphilitic disorders of the brain, the spinal cord, and the peripheral nerves appear at varying intervals after the initial infection. Heubner, in his excellent article in Ziemssen's *Encyclopædia*, tabulates numerous cases in which he was able to ascertain the interval between the date of the initial infection and the appearance of syphilitic nerve disease. In some cases nine months sufficed for the development of brain syphilis; in the majority a period of more than three years intervened; and in some, thirty years had elapsed since the time of the initial infection. My own experience has impressed several points upon me: first, that those who acquire syphilis when comparatively young (say under twenty-five) are more apt to develop cerebro-spinal syphilis; secondly, that in such subjects syphilitic nervous disease is apt to appear within two or three years after the initial infection; and, lastly, I have been convinced, rather against my former views of the duality of the syphilitic lesion—that syphilis of the nervous system appears not infrequently after soft chancre without the customary secondary eruptions. This is particularly true of cases of tabes and of ocular palsies.

The question arises, whether syphilis of the nervous system is due to improper treatment during the initial period. This can be answered in the affirmative for the majority of cases. Some of the worst cases of

syphilitic dementia and of general paresis in young subjects that I have seen have affected persons who, for reasons of shame or from ignorance, sought no medical advice in the earlier periods of the disease; while, on the other hand, I have in my records the histories of young men who have had treatment for years, have made annual pilgrimages to Hot Springs or Aix-la-Chapelle, and who, in spite of all treatment, have developed tabes, ocular palsies, or even general paresis at the end of a few years. Much evidently depends upon the intensity of the initial infection, though I wish also to record the further impression that nerve syphilis frequently enough appears after a very slight initial infection, and without the development of secondary symptoms in any other organ or system of the body.

How can we diagnosticate the syphilitic character of disorders of the nervous system?

1. By proving the existence of other symptoms of constitutional syphilis; by the occurrence of such accidents in the history of the patient as are known to be due to syphilis (miscarriages, stillbirths, etc.). This may lead to error, for persons with constitutional syphilis may suffer from any other of the diseases and accidents to which the nervous system is liable, or persons with undoubted syphilitic nerve disease may reveal no other symptoms of constitutional syphilis.

2. By exclusion of all other possible causes. This would be difficult indeed to establish, were it not for the fact that many of the cerebral and cerebro-spinal lesions not due to syphilis occur only at definite periods of life, whereas syphilitic lesions may occur at any period. Thus cerebral hæmorrhage or thrombosis (with the resulting hemiplegia), if it occurs before the age of forty-five and if it is not of traumatic origin, is most apt to be due to syphilis. It is true also of any case of apoplexy or of epilepsy coming on in young persons between twenty-five and forty-five years, that, if not due to trauma or heart disease, it is probably syphilitic.

3. By showing the analogy between the symptoms presented by the patient and definite clinical pictures which are known to be due to syphilis. This furnishes by far the most valuable proof to be obtained; it should enable us to make the diagnosis of syphilis of the nervous system without even inquiring for the suspected etiological factor.

4. By the result of antisiphilitic treatment. This is of value in some cases in which the response to treatment is unusually prompt; but the argument is often fallacious, inasmuch as undoubted syphilitic disorders often do not yield to specific treatment, and, as I shall show by a post-mortem examination to be recorded later on, diseases which are not syphilitic may exhibit remarkable remissions under antisiphilitic treatment.

I consider it to be my chief duty in this article to pay special atten-

tion to the point mentioned in the preceding paragraph 3, which will necessitate a very careful study of the symptomatology of syphilitic diseases of the nervous system.

Such studies have been made without number for the past centuries. (The older literature of this subject can be found in the article by Heubner in Ziemssen's Cyclopædia and in Rumpf's Monograph.) The medical history of this subject goes back as far as Ulrich von Hutten, who is supposed to have been the first to recognize the importance of syphilis in the development of paralysis and apoplexy. Paracelsus, Astruc, Van Swieten, and others, considered syphilis to be the mysterious cause of any and many disorders of the nervous system. Hunter went to the opposite extreme of declaring that neither the brain nor the abdominal viscera is ever subject to syphilitic disease. Hunter's views obtained general credence and were practically in force until Virchow showed that a certain peculiar infiltration of the meninges, and the development of gumma in the skull and in the cortical tissues of the brain, were due to syphilis.

Virchow (in Virchow's Archives, vol. xv, in his monograph on tumors, and in numerous other publications) also established the importance of granulation tissue in all morbid processes due to specific disease. Steenberg (Den syph. Hjørnelideloefs, Copenhagen, 1860) was the first to lay special stress upon the fact that the disease of the blood-vessels was of greatest importance in the development of syphilitic disease of the brain and spinal cord. Heubner, to whose work in this special field all later authors are greatly indebted, insisted that the changes in the arteries started from the endothelium, and since the publication of his monograph specific endarteritis has been considered the most frequent condition in all specific diseases of the brain. Köster (Sitzungsber. der niederrh. Gesellsch., etc., 1875) and Friedländer (Centralbl. f. d. med. Wissensch., 1876) opposed this view of the rôle played by the endothelium, and Baumgarten (Virchow's Arch., vol. lxxiii) insisted that the morbid process began in the connective tissue of the adventitia; while Rumpf (Monograph, Wiesbaden, 1887), who has written the most extensive monograph within recent years on this subject, attributes the most important rôle to the muscular coat of the arteries, from which, in his opinion, the granulation tissue is apt to emanate. The purely pathological discussion of this subject was for a time superseded by the excellent clinical studies of Charcot (Charcot et Gombault, Journal de la Physiol., vi, 1863; Arch. de Physiologie norm. et path., 1873), Jackson (Journal of Mental Sciences, 1874 and 1875), Fournier (La Syphilis du Cerveau, monograph, Paris, 1883), Greiff (Arch. f. Psych., vol. xii), Westphal (Arch. f. Psych., vol. xi), Schmauss (Arch. f. kl. Med., vol. xxxiv, 1889), Oppenheim (Berl. kl. Wochenschr., 1888; reprint of lecture, Berlin, 1890),

Strümpell (*Deutsch. med. Wochenschr.*, 1889), Erb (*Neurologisches Centralblatt*, 1892), Siemerling (*Arch. f. Psych.*, vols. xix and xx), Eisenholtz (*Neurologisches Centralbl.*, 1884), and others too numerous to mention.

The question of the relation of syphilis to tabes has led to researches which have thrown much light upon the general syphilitic disorders of the nervous system. In this special field Fournier and Erb (see Erb's recent and conclusive papers in the *Berl. kl. Wochenschr.* for 1891 and 1892) have insisted on the causal relation between syphilis and tabes, as proved by the extraordinary percentage of syphilitic cases among tabic patients, while Westphal and Leyden (*Charité, Annalen*, 1876, and *Berl. kl. Wochenschr.*, 1892) have denied that tabes was due to syphilis.

In this country very few contributions have been made to this special subject. In recent years, Gray (*Med. News*, 1887), Wood (*Transact. of Coll. of Phys., Phil.*, 1884), and myself (*N. Y. Med. Journal*, 1891) have contributed clinical and pathological articles.

THE PATHOLOGICAL ANATOMY OF SYPHILIS OF THE NERVOUS SYSTEM.

General Considerations.—It is now well established that the morbid processes in the nervous system due to syphilitic infection may involve, 1, the bony parts inclosing brain and spinal cord; 2, there may be syphilitic neoplasm of the nervous system and its coverings; 3, we may have syphilitic disease of the larger vessels.

Very little need be said about the specific processes beginning in the bony parts surrounding the central nervous system, and secondarily involving the nervous tissue itself. Gumma of the skull or of the spinal vertebrae may by pressure or by actual encroachment of the parts underneath the bone lead to serious impairment of function, the symptoms naturally varying according to the site of the gummatous deposit in the bone or of the gummatous infiltration of the parts underneath. The syphilitic neoplasm or diffuse syphilitic infiltration of the nervous system and its coverings is a most frequent cause of disorders of the brain and spinal cord. This occurs most frequently in the dura mater or in the subarachnoid space. From the subarachnoid space the process is apt to invade the pia, and in this way has easy access to the cortical tissue or to the cranial nerves; for it should be remembered that, like the tubercular process, the syphilitic infiltration is very apt to occur at the base of the brain, and more particularly in the interpeduncular space. There can be little doubt but that the specific neoplasm or specific infiltration starts frequently from the connective tissue; in rare instances it starts from the blood-vessels themselves. The diffuse specific infiltration is often associated with well-circumscribed tumor formation, as I had occasion to find in a

case reported by me some time ago, in which there was diffuse specific cerebro-spinal meningitis with a special gummatous deposit in the pons.* This specific infiltration is at times of a reddish, at times of a grayish hue, as a rule of a more or less gelatinous character, though sometimes it assumes the consistency of connective tissue. The true character of this infiltration is at times obscured by all sorts of retrogressive changes, possibly the result of treatment, but more often due to a practical self-limitation of the disease, inasmuch as the rapidly proliferating granulation tissue supplied by diseased blood-vessels is apt to be checked in its growth by the obliteration of these blood-vessels in consequence of an arteritis obliterans. The study of these specific morbid processes will lead every one to an appreciation of the very important part played by the blood-vessels. Rumpf is so thoroughly convinced of this, that he is inclined to place the general specific infiltration and the specific endarteritis in one box, and claims that in the one case the disease starts from the blood-vessels of the connective tissue, while in the case of arterial disease the process starts from the vasa nutrientia of the blood-vessels themselves. But we must pay a little more attention to the specific disease of the blood-vessels.

While Virchow, as long ago as 1847, recorded the observation of the caseous infiltration of the dura mater at the base of the brain, leading to compression of the carotid, with thickening of its walls and subsequent thrombosis, the credit of having discovered the genuine specific disease of the arteries themselves is due to Steenberg and Heubner. Heubner maintained that the syphilitic process took its start between the elastic lamella of the intima and the endothelium; that it consisted of a proliferation of endothelial cells which gradually formed into connective tissue consisting of spindle and star-shaped cells. Into this connective tissue an emigration of round cells took place which led to the formation of granulation tissue, very much like the tissue of syphiloma found elsewhere in the body. Heubner also insisted that this process led naturally to a gradual occlusion of the artery, but that it also spread lengthwise along the blood-vessels, and thus soon involved a very extensive area of a given blood-vessel within its clutches. The occlusion of the arteries leads to a cessation in the proliferation of this granulation tissue, and ultimately to the formation of a cicatrix, thus necessarily bringing about an entire loss of function of the tissues supplied by the affected blood-vessel.

Köster, in opposing Heubner, maintained that the intima did not play the important part which Heubner claimed for it, but that the vasa vasorum were the actual starting point of disease. He endeavored to prove that only such arteries as contained these smaller blood-vessels were

* See plate at end of this article.

ever the seat of disease. Friedländer maintained that what Heubner described as a specific endarteritis was nothing but a typical arteritis obliterans; and Heubner himself, in a later article (*Virchow's Arch.*, vol. lxxxvi), acknowledges the correctness of Friedländer's criticism, at the same time denying that the muscular or the adventitious coat is necessarily the starting point of the specific disease. Heubner says: "No proliferation, no tumor caused by syphilis, is in any way specific; the etiological factor stamps it as a specific process" (*Ziemssen's Cyclop.*, Germ. ed., p. 300, foot-note.)

The status of our pathological knowledge regarding all the specific morbid processes underlying nerve syphilis is well summarized by Rumpf in his monograph. The following are his main conclusions: First, syphilitic disease of the nervous system emanates invariably from the blood-vessels. We have to distinguish between a syphilitic infiltration of the capillaries of the connective tissue and the syphilitic infiltration of the capillaries of the blood-vessels. Both processes may lead in rare cases to the formation of circumscribed tumors which in a certain stage of retrogressive metamorphosis may be termed gummata; but these processes more frequently lead to widespread infiltrations. The retrogressive metamorphosis is due largely to the insufficient blood supply brought about by disease of the blood-vessels. Syphilitic infiltration of the capillaries of the blood-vessels may give rise to loss of function by occlusion of the blood-vessels, or by laceration of the blood-vessels leading to hæmorrhage. The softening and hæmorrhages which occur in specific cases are secondary phenomena.

All these careful researches have, after all, led to the rather disheartening conclusion that there is nothing absolutely characteristic of specific disease. The very same changes which we find in undoubted syphilitic cases are equally characteristic of leprosy, and even of tubercular deposits, with the exception that tubercular deposits tend rather to caseation, while syphilitic products are apt to undergo retrogressive metamorphosis. It was hoped that the bacteriological researches begun by Klebs (*Arch. f. exp. Pathol. u. Pharm.*, 1879), Disse and Taguchi (*Deutsch. med. Wochenschr.*, 1885), Doutrelepont (*Wiener med. Wochenschr.*, 1884), and Lustgarten (*Verhandl. des Congr. f. innere Med.*, 1885) would lead to the discovery of the bacillus of syphilis, the presence of which would prove the syphilitic character of any morbid process, as the presence of Koch's bacillus proves the tuberculous character of a given lesion. But these investigators have failed of their purpose, and to-day we are not much nearer to the solution of this problem than we were ten years ago.

In a paper published in 1891 I remarked that "whether or not the vast differences in the ultimate fate of tubercular or syphilitic products, in spite of their histological resemblances, is due to the differences in the

life history of the bacilli of tuberculosis and of syphilis, is a question for the bacteriologists to decide"; but we must wait patiently until this decision is reached. In the meantime we have to push still more vigorously than before the purely clinical studies in reference to syphilis of the nervous system. This part of the subject can be pursued satisfactorily if we make the necessary subdivisions and study in the order mentioned here: 1. Syphilis of the brain and its coverings. 2. Syphilis of the spinal cord and its coverings. 3. Syphilis of the peripheral nerves.

1. SYPHILIS OF THE BRAIN AND ITS MENINGES.

The symptoms of syphilis of the brain and of its meninges will be best understood if we revert once more to the pathological anatomy of the syphilitic processes affecting the intracranial contents. We have to distinguish between the syphilitic neoplasm which may invade the meninges, or the brain proper; the diffuse meningeal infiltration with special gummatous deposits; and, lastly, specific disease of the arteries of the brain proper. The syphilitic neoplasm, or gumma, occurs most frequently in the cortex of the brain, directly or indirectly involving the meninges; much more rarely in the vicinity of the larger ganglia. Next in frequency to cortical gummata are those which occur in the pons, medulla, or crus. The symptoms of a syphilitic gumma will resemble very closely those produced by any other form of neoplasm, with such few modifications as are characteristic of syphilitic disease in all parts of the nervous system.

The diffuse specific meningitis, or meningeal infiltration, is the prime cause of a very large proportion of cases of brain syphilis. From its topographical development this specific infiltration naturally leads to the same set of symptoms which we find in connection with other cortical and meningeal processes, except that the very diffuseness of the pathological process and the diffuseness of the symptoms are characteristic of syphilis rather than of any other disease, with the possible exception of tubercular affections of the brain and meninges. This diffuse specific infiltration may start from the arachnoid, or pia, soon invades the cortex, leading to an adhesion between the cortex and the pia. Inasmuch as the entire specific process corresponds accurately to a slow form of chronic inflammation, we may well describe this special and frequent form of brain syphilis as a specific leptomeningitis, or meningo-encephalitis. This may occur over any portion of the hemispheres; it may cover almost an entire hemisphere, or even both hemispheres, while in some cases it may be distinctly circumscribed. But inasmuch as the same leptomeningitis may affect the base of the brain as well as the cortex, we find a ready explanation for the frequent occurrence of cranial nerve symptoms, with or

without paralysis in some cases, while in other cases we have monoplegia, or hemiplegia, which we know to be due to cortical disease only. The very variability in the extent and in the intensity of development of syphilitic lesions makes the cases of brain syphilis the very best examples one could find for the study of the functions and the pathology of the various parts of the brain.

Syphilitic disease affecting the arteries of the brain, whether it be an endarteritis, a mesarteritis, or a peri-arteritis, ultimately leads to the occlusion of the blood-vessel by thrombosis, and thus interferes with the function of the parts supplied by the diseased vessel. In other instances the walls of the diseased blood-vessels may cause the formation of small aneurisms, and may lead to hæmorrhage, just as the well-known miliary aneurisms that occur in advanced life are the cause of the majority of the cases of apoplexy after the age of forty-five. Occasionally, too, a particle dislodged from a thrombus formed in a blood-vessel whose walls have undergone specific changes may give rise to embolism in other parts of the brain. It is important to remember, however, as a practical rule, that thrombosis is by far the most frequent cause of apoplexy in syphilitic subjects, and that, therefore, in any case in which the onset of the apoplexy suggests thrombosis, the probability of syphilitic disease is very great, and if the symptoms in other cases point to the probability of hæmorrhage as the cause of apoplexy, it should not be forgotten that this, too, occurs as a result of syphilitic arterial changes.

It is not only of importance to recognize the probability of syphilis from the occurrence of thrombosis, or hæmorrhage, in comparatively young subjects, but also to note that while arterial disease, due to syphilis, affects the ganglionic region most frequently, and next in frequency the base of the brain, it rarely is the cause of syphilitic disease in the cortex or in the meninges. Syphilitic disease of the cortex and its coverings is, with the rarest exceptions, due to the specific infiltration, or possibly to the deposit of one or more syphilitic tumors.

Symptomatology.—A few general symptoms may be mentioned at the outset which are common to all syphilitic diseases of the brain. First and foremost, persistent headache in persons who have not inherited such tendencies, and who have not been exposed to any traumatic injury, is very suspicious of syphilitic brain disease. This headache is generally diffuse, though in a few cases it may be most marked along the distribution of one or the other of the trigeminal branches. This headache is the expression of the inflammatory process in the meninges, and inasmuch as it frequently precedes apoplectic attacks which are caused by disease of the blood-vessels in the interior of the brain, it is fair to suppose that the meninges are more or less affected even in such cases; while the headaches in cases of specific leptomeningitis, or of specific

encephalitis, are the natural result of the peculiarity of distribution of specific disease.

Another symptom characteristic of all syphilitic brain diseases, and for that matter even of spinal syphilis, is the extreme variability of the symptoms. No other morbid process is as apt as syphilis is to cause most alarming symptoms—say coma, convulsions, paralysis—on one day, all of which may disappear (at times within a few hours), and often enough within a period of a few days. I have also held (in a paper on Syphilis of the Spinal Cord read before the N. Y. Neurological Society, April, 1893, but not yet published) that the disproportionate relation between the extent of area affected by syphilitic disease and the slight intensity of the disease in any given area is characteristic of the specific process. I have seen cases of syphilitic brain disease implying by their symptoms involvement of an entire motor area of the occipital portion of the cortex, and even of the base, and yet proving by the paresis and not paralysis of the parts affected, by the very transitory visual defects, by the rapidly receding ocular palsies, that the morbid process, although extending over a very large portion of the brain, did not seem to be developed to any marked degree in any one portion. Other morbid processes, like multiple hæmorrhages, or multiple malignant tumors, or tubercular deposits here and there in the brain, would give rise to such grave general symptoms as are not apt to occur in cases of syphilis.

Still another characteristic of syphilitic disease of the entire central nervous system is found in the fact that in cases with brain symptoms we get the history of a previous affection which must necessarily have been due to disease of the spinal cord; and *vice versa*, in the cases of typical spinal syphilis we find evidence of former syphilitic brain disease. Bearing these general symptoms in mind, we can proceed to the consideration of the special symptoms due to the localization of the specific process in the different parts of the brain.

Disease of the Cortex and the Meninges.—These cases will surely be characterized by persistent headaches; but while similar headaches may occur together with a different localization of disease, they may, if definitely circumscribed, lead to the conclusion that patches of specific meningitis exist under those areas of the skull which are painful to touch or in which the patient localizes the headaches. These headaches are apt to be associated with stupor or coma, the degree of each depending upon the intensity of the process. It is in keeping with our understanding of the pathological character of the specific meningo-encephalitis that these symptoms, namely, stupor and coma, are rarely developed suddenly, but as a rule come on in insinuating fashion and are gradually increased. Both stupor and coma may be absent in cases in which the headaches are associated with another symptom of the very greatest import: I refer to local-

ized convulsive seizures, localized epilepsy, or Jacksonian epilepsy. These convulsive seizures, ever since the investigations of Jackson, are known to be the result of irritation of the cortical centers; and inasmuch as the motor areas which show a remarkable predisposition to every form of intracranial disease are also frequently the seat of specific disease, it is natural enough that convulsive seizures of an arm, of a leg, of the face muscles, when associated with headache, with stupor, or with coma, should point, in the absence of other causes, to specific disease of the cortex. If the general symptoms, headaches, stupor, and coma, are associated with hemianopsia, with motor aphasia, with sensory aphasia, with impairment of taste and smell, or with epileptic seizures, preceded by distinct olfactory, gustatory, or auditory auræ, the inference may be made that the specific process is chiefly developed over the centers governing these functions. Diagrams illustrating the exact position of these various centers can be found in any of the many recent text-books (Gowers, Dana, Gray), and I do not consider it necessary to enter upon the explanation of these details, which, after all, have become common property. If the specific disease is developed over the frontal (silent) parts of the brain, we are apt to have general symptoms only, with possibly nothing but localized frontal headaches pointing to the probable seat of the disease. From a practical point of view specific disease affecting the motor areas is of the very greatest importance, and whether this be due to actual gumma or to patches of specific meningeal disease, the symptoms will be very much the same, with the exception that, in cases of tumor, there may be the accompanying symptoms generally recognized to be the result of neoplasm, namely, optic neuritis, vertigo, nausea, etc. The following are the symptoms of specific disease over the motor areas. Keep in mind again the general symptoms, and you will expect in every case to obtain the history of headaches, diffuse or circumscribed; you may obtain an account implying exceeding variability of this and of other symptoms; you may have stupor or coma, and in addition to these general symptoms you will have the following localizing symptoms: First, epileptiform seizures, with or without loss of consciousness, beginning in any part of the face, the upper or lower extremities, gradually extending to other parts, and possibly leading, before the seizure is over, to general convulsions. Such epileptiform seizures may have existed for some time before paralysis of the parts first convulsed sets in. This paralysis denotes that the irritation of cortical centers has led to a destruction of a part or of the whole of the center. Even after the parts have become completely paralyzed epileptic seizures may occur, as Nothnagel pointed out, in which the paralyzed parts become convulsed. Convulsions may occur, to be sure, in connection with disease in the interior of the brain, in the initial stages, for instance, of an attack of apoplexy, due to disease

of one of the branches of the middle cerebral artery leading to a loss of function of the fibers passing through the capsula interna. But what I hold to be extremely characteristic of cortical as opposed to intracerebral disease is the occurrence of *repeated convulsions*. A single convulsion associated with such general symptoms as I have mentioned and with the onset of paralysis is therefore not characteristic of cortical disease; but if we have a paralysis firmly established and repeated convulsions of the parts paralyzed, we may be certain that the disease is in the cortex, and not in the region of the larger ganglia. Inasmuch as the leptomeningitis or the gummatous neoplasm may be developed over circumscribed areas of the cortex, it is natural to expect that monoplegia will be a frequent form of syphilitic disease of the cortex and the meninges. Such cases undoubtedly do occur, but they are of far less frequency than one would suppose, and are more apt to be due to the syphilitic neoplasm than to diffuse syphilitic disease of the cortex or meninges. These cases of monoplegia sometimes terminate, from the mere diffusion of the process, in cases of hemiplegia. The following case from my own experience will illustrate the point, and will show the extension of the disease from the arm center to the leg and face centers. It will also bring out the salient points of syphilitic cortical disease:

Mr. S., aged fifty, a widower, was seen by me in the autumn of 1888. By his family physician I was told that he had contracted syphilis after the death of his wife, having passed through the various stages of constitutional syphilis, preceded by the development of hard chancre. He had received the most careful treatment, first by mercury, and later on by the iodides. About six months previous to the time of my first visit he had begun to complain of intense headaches. Three months previously he had had, during periods of excitement, attacks of transitory motor aphasia. As he was passing through a great deal of excitement in his business, no special cause was suspected as an explanation of these attacks. About a month before my first visit the patient complained of involuntary twitchings in the right half of the face, and the occasion of my seeing him was the first occurrence of a typical convulsive seizure of the right upper extremity beginning in the wrist, attended by a short period of unconsciousness and followed by a weakness of the right hand. A thorough examination of the patient revealed no symptoms referable to any other part of the body except that the right knee-jerk was much increased, but at this period there was no ankle clonus. The subsequent history of the case was simply this: the convulsive seizures increased in frequency; for a time they were strictly localized, after a while they terminated in general convulsions. The paralysis of the hand increased gradually, a weakness of the leg supervened, permanent motor aphasia was established, and within six months of my first visit a gradual development of dementia was noticeable. The man became permanently bedridden, became absolutely demented, remained completely paralyzed on the right side of the body, and finally died in 1890, two years after the onset of the first symptoms. It is needless to say that he was given the benefit of extreme antisymphilitic treatment, which brought about slight remissions at times, but did not suffice to

check the downward progress of the disease. The patient's other organs were entirely sound. There was no heart disease, there were no symptoms of kidney trouble, and his arteries were not even atheromatous.

The entire development of the case, following quickly upon the acquisition of syphilis late in life, lends support to the view that this was a typical case of specific meningo-encephalitis, chiefly over the left motor area.

The case just recited constitutes an exception in point of severity to many of the cases of syphilitic disease of the cortex or of the meninges. We meet with cases every now and then in which the suspicion of syphilitic disease of the cortex is strengthened by the preponderance of the localizing symptoms over the general symptoms. Thus we may have a complete hemiplegia with occasional localized convulsions, without stupor, coma, and with only slight headaches. Imagine such a series of symptoms due to hæmorrhage over the cortex, and it will at once be seen that a hæmorrhage which would have been sufficient to bring about a loss of function of the leg, arm, and face centers would surely have produced very marked general symptoms. The initial stages of such a case would have been characterized by the most profound coma, which would have lasted for days, if not for weeks; whereas the circumscribed development of the syphilitic process, both in the cortex and in the meninges, need not cause such marked general disturbances.

Syphilis affecting the Larger Ganglia.—In the interior of the brain gummatous deposits are of such exceeding rarity that we can practically disregard them. If they do occur, they will be followed by all the symptoms due to neoplasm in this region. The manifestations of syphilitic disease of the larger ganglia are due to arterial disease. The specific arteritis to which reference has so frequently been made is prone to attack one or more of the branches of the middle cerebral artery which supplies the region of the internal capsule through which the motor tract supplying the opposite half of the body passes. A small lesion, whether it be a hæmorrhage or softening as the result of the arterial occlusion, may in this part of the brain give rise to widespread symptoms, for the fibers going to the opposite half of the body are closely packed together within an area not much greater than that of a good-sized pea. Syphilitic arterial disease in this region leads to apoplectic attacks closely resembling in most respects ordinary adult apoplexy. Inasmuch as thrombosis is by far the most frequent result of this special form of arterial disease, a slow onset of the apoplectic attack so characteristic of a gradual occlusion is frequently noticed. It is not an apoplexy in the good old sense of the word; the patient is not stricken down as by a blow, but he first notices a peculiar numbness, say in the hand, the face, or the leg, or in several of these parts at one and the same time. This numbness gives way to a

weakness, and after the lapse of a few hours, or possibly even a longer period of time, the hand that was weak becomes paralyzed, to be followed by the same change of symptoms in the case of the face or the leg. There is, as a rule, no loss of consciousness, and the initial convulsions which are the rule in cases of hæmorrhage, and also in cases of embolism, are absent in the majority of these syphilitic apoplexies. If syphilitic disease of the arteries leads to hæmorrhage, the only difference between these cases and those due to thrombosis is in the more rapid onset of the paralysis, and in the greater likelihood of the occurrence of coma and convulsions at the onset. But let me state once more that in apoplexies due to lesions in this region the convulsions are not likely to be repeated.

Paralysis due to thrombosis of syphilitic arteries may be as lasting as those due to other diseased conditions of the arteries, but in some instances recovery is remarkably rapid. Whether such a thrombus is more apt to become canalized, or whether the collateral circulation does its duty more fully, possibly because it has been prepared for the emergency for a longer period of time prior to the actual accident, it is difficult to state. These cases are characterized, furthermore, by all the symptoms so well known in connection with cases of adult cerebral palsies. The leg is most apt first to recover, the face next, the arm last of all. The reflexes are increased in the paralyzed extremities. This is true of the wrist reflexes, the elbow reflex, the knee-jerks, and the ankle clonus. The faradic response remains normal throughout the entire period of paralysis. No appreciable amount of atrophy takes place, but contractures are very apt to set in. Here, again, a case seen in private practice may illustrate the chief points :

Mr. J., a lawyer, thirty-two years of age, has been guilty of excesses, sexual and alcoholic. Acquired syphilis five years ago ; received active treatment and was in good health until the summer of 1892, when he became irritable, developed difficulties of speech, particularly if he attempted to address a jury, began to forget names, and complained of serious headaches which troubled him both day and night. In August, 1892, had had a first apoplectic attack, in which he lost speech completely and was paralyzed in the right half of the body. When I examined him in September, 1892, his speech was still a little deficient, but he had entirely recovered from the attack of hemiplegia. During the subsequent months he had a few attacks of transitory weakness of the right leg, so that he appeared to be in danger of falling while on the street, and for fear of these attacks he never walked out unaccompanied. In January, 1893, I was called to his house, and found him afflicted with typical motor aphasia. He was not able to utter a word, but could make himself understood by signs, and evidently understood every word that was said to him, answering all my questions correctly as far as he could by sign language. His right arm was weak. While sitting at his bedside I noticed that he endeavored to move the right leg, and at first succeeded in doing so a little ; but presently the strength in the arm seemed to diminish and the leg became absolutely paralyzed. For a week arm and leg

remained completely paralyzed. Speech was entirely absent, but there was never, from the very beginning of this trouble, even a momentary loss of consciousness. Convulsions also were entirely absent.

At the end of a week he began to utter a few words, the leg began to recover, the arm also quickly recovered, and now, after the lapse of a little less than three months, he is entirely well. There is not a single trace of the old hemiplegia, barring a lively knee-jerk on the right side, and his speech shows only a very slight tremor. The headaches have entirely ceased, and he is now ready to return to his work—thanks, as I think, to the enormous doses of iodide and mercury that he had received, and to the general tonic treatment that he was subjected to. Were it not for the fear that other attacks may at any time occur, he could be pronounced entirely cured.

Lesions of the Crus.—Syphilitic lesions caudad of the internal capsule are apt to be due either to arterial disease or to disease of the basilar meninges. The general symptoms of syphilitic disease will be the same as those noted in the case of disease of the cortex and of the internal ganglia, except that syphilitic disease at the base of the brain is distinguished from disease in or over the cortex by the absence of repeated convulsions and by the lesser likelihood of development of stupor and coma. The localizing symptoms, on the other hand, are of a very definite character, inasmuch as the hemiplegic form of paralysis is associated with paralysis of various cranial nerves. Thus in cases of crus lesions we have paralysis of some or all of the muscles supplied by the third nerve of one side, with hemiplegia of the opposite side of the body. The clinical picture consists, as a rule, of a ptosis of one eye, complete paralysis of all but the rectus externus muscle, associated with an alternate hemiplegia.

Lesions in the Pons.—These are characterized by an alternate form of paralysis implying paralysis of the facial nerve in all its branches, together with paralysis of the arm and leg of the opposite side of the body. In these cases the trigeminal nerve may be involved, the auditory as well, possibly the sixth nerve. Thus we may have all the complicated symptoms which are so characteristic of pons lesions, due to whatever cause.

Lesions of the medulla are not infrequent in syphilitic patients. The cranial nerves whose nuclei are situated in the medulla, the hypoglossal, the glossopharyngeal, the accessory, the vagus, any or all of these nerves may be involved, and associated with these there may be a paralysis of the upper and lower extremities of the opposite side of the body. The pyramidal tracts containing the motor fibers are in this region so close to the median line that a small patch of meningeal infiltration may involve both of them, and thus we may have a paralysis of all four extremities, together with paralysis of the nuclei of the nerves emanating

from this part of the brain. A most interesting case of this character I had occasion to describe a few years ago in my paper on Multiple Cerebro-spinal Syphilis. The case, which was unique in many respects, deserves to be recorded here.

W. K., a saloon-keeper, single, a heavy-set man of forty odd years, came to the Polyclinic in the autumn of 1888. He confessed to syphilitic infection, with secondary skin and throat symptoms, a few years previously. About a year before his first visit he had noticed a heaviness in the tongue and a numbness of the left hand; soon the left hand grew weaker, speech became more and more difficult, deglutition was interfered with, and by degrees the left leg grew weaker. It was only by the greatest effort that he was able to drag his heavy body to the clinic. On examination, his symptoms were a very marked atrophy of left half of tongue, and, to a slighter degree, of right half; fibrillary twitchings about equal in both halves; complete reaction of degeneration, with altered galvanic response in left half of tongue; in right half faradic response was extremely weak, but galvanic response was not altered. There was no symptom indicating involvement of any other cranial nerve, as determined by careful testing. Jaw clonus was present; we also noted the exaggeration of both wrist reflexes, triceps reflexes, and both knee-jerks, reaction of degeneration, and also double ankle clonus. No sensory impairment. At this time the greater involvement of the hypoglossal nerve on the same side as the greater hemiparesis was a little puzzling. The diagnosis was made of syphilitic disease in the region of the medulla, and the patient was placed on large doses of the iodides. The symptoms soon grew worse, the right arm and right leg becoming as paretic as those of the left side. The patient's helpless condition necessitated his being put into the Polyclinic Hospital. Here the mercurial and iodide treatment was pushed to the extreme, the patient receiving fully four hundred and fifty grains of the iodides and a drachm of mercurial ointment *per diem*. After two weeks the symptoms began to recede; the right arm and leg improved to such an extent that the patient appeared to have a left hemiplegia with bulbar symptoms; but in the course of another year the hemiplegia was practically reduced to a paretic condition of the left arm, and even the bulbar symptoms disappeared in an astonishing fashion. One day, intending to demonstrate the reaction of degeneration before the students on the tongue of this patient, I was surprised to find the faradic response present, and at later examinations there was nothing but a slight sluggishness of galvanic contractility to remind me of the former reaction of degeneration; the atrophy was also less marked. The patient remained in about this same condition; slight relapses would occur every now and then, which were counteracted or checked by an increase in the administration of the iodides. He was doing extremely well, for months visited the clinics regularly, by request exhibited himself at other institutions, and nothing but the paretic condition of the left arm and a limp with the left leg reminded one of his old and serious trouble. In March of this year he was seized with pneumonia, which ended fatally after a few days.

Basilar specific processes lead so frequently to an involvement of the cranial nerves without involvement of the pyramidal tracts underneath that we must devote a special section to the consideration of these forms

of disease; and as the affection of the oculomotor nerves is of practically the greatest importance and is typical of the other specific cranial nerve affections, let us examine more particularly into the character of

OCULOMOTOR PALSIES.

In not a few instances these ocular palsies are the first and sometimes the only symptoms of nerve syphilis. The third and the sixth nerves are those most frequently affected. The fourth nerve may be diseased, but since it is rarely affected without the simultaneous involvement of the third nerve, the resulting paralysis of the superior oblique muscle is of very little practical importance. If the third nerve is the one chiefly affected, we are bound to have either ptosis or a more or less complete paralysis of all the oculomotor muscles except the superior oblique and the rectus externus, the former being innervated by the fourth nerve, the latter by the sixth. In addition to the paralysis of the external muscles of the eye there is also a paralysis of the internal muscles, causing a loss of light-reflex and a failure of pupillary contraction during accommodation. Whenever we find some but not all of the muscles supplied by a cranial nerve paralyzed, we are justified in drawing the conclusion that the seat of the trouble is in the nuclei of the nerve, and not in the nerve tract after it issues from the brain. The nucleus of the third nerve stretches along the floor of the third ventricle, and is of such considerable extent that the various subdivisions can be distinctly recognized, and one or more of these subdivisions in which the function of individual or of closely related muscles is represented may be diseased, while other groups may entirely escape. This nuclear ophthalmoplegia, as it is called, is sometimes due to specific disease, as cases quoted by Rumpf amply prove; but it is wrong to suppose, as I pointed out in a former article (*Am. J. of Med. Sc.*, Sept., 1889), that partial ocular palsies in syphilitic subjects are always the result of nuclear disease. Some years ago Thomsen (*Arch. f. Psych.*, vol. xviii) reported an interesting case in which a nuclear paralysis was simulated by a gummatous infiltration of the root fibers of the third nerve, and in the paper above referred to I came to the conclusion that "paralysis of one or more muscles, and not of all muscles supplied by the oculomotor nerves, does not necessarily imply a nuclear lesion, . . . for in syphilitic cases an affection of the nerve rootlets may give rise to symptoms exactly like those of nuclear disease."

Next in frequency to palsies of the third nerve are those of the sixth. As the result of disease of this nerve the rectus externus is paralyzed. Double vision is the most common symptom complained of by patients suffering from any form of specific ocular palsy.

A special value attaches to these ocular palsies from the fact that not

a few cases of tabes begin with paralysis of one or the other muscles of the eye; and since syphilis plays such an important *rôle* in the etiology of tabes, there is always a strong suspicion that an ocular palsy may not be merely a transitory and isolated affection, but that it may represent the beginning of grave spinal-cord disease. At all events, it will be well in every case of ocular palsy to examine the knee-jerks, to inquire into the subjective symptoms of the patient, to examine for the Romberg symptom (that is, whether the patient can stand without swaying with eyes closed), in order to exclude the possibility of tabes. These syphilitic



FIG. 1.—Patient at rest.

ocular palsies are thoroughly amenable to treatment, though in some instances the paralysis is permanently established, and tenotomies of opposing muscles yield the only possible relief. Of the many cases of such palsies that I have seen I will cite but two: the one, showing the vast improvement made under specific treatment; the other, the utter uselessness of all therapeutic efforts.

The first case is that of a young girl who was sent to me from Connecticut in the early autumn of 1892. The history she gave was to the effect that on the 4th of July, 1892, she suddenly found that she was not

able to raise the left eyelid, and when lifting it with her finger noticed that the eye stood in the extreme outward position. No other symptoms were recorded except a slight dizziness and headaches, which had preceded the onset of the ocular palsy and continued for several days thereafter. She was under treatment by her home physician, but had not improved at all at the time when she first consulted me, about three months after the onset of the trouble.

At the first examination I noted complete ptosis and complete paralysis of all external muscles excepting the rectus externus, and also paralysis of the sphincter iridis. There was no involvement of any other part of the body, no hemiplegia, and no paralysis of any cranial nerve. I came to



FIG. 2.—Position of eyes when patient attempts to look to the extreme right.

the conclusion at once that this must necessarily be a specific palsy, although I could not, within the limits of a first examination, get any facts pointing to syphilitic infection; nor have I been able positively to prove this, although there is a strong suspicion of syphilis in the mother of the patient. I placed her upon large doses of the iodides, prescribed mercurial inunctions, and was gratified to find an improvement within two weeks of the first inunction. This improvement has been steadily in-

creasing, until now she is able to raise the eyelids at will, and can move the eye inward, so that the pupil passes the median axis of the palpebral fissure. The accompanying photographs will show the appearance of the eye when at rest, and of the position of the eye upon extreme volitional effort. There is no doubt in my mind but that the ocular palsy will be still further diminished, and that it may possibly disappear altogether. If the therapeutic test is ever to aid us in diagnosis, it may do so in a case like this, in which the improvement set in very promptly after the proper administration of specific treatment.

The second case is that of a young man, aged thirty, who had acquired syphilis about five years previously. There had been some few constitutional symptoms; he had suffered much from headaches and from dizziness. In the autumn of 1889 he first consulted me on account of double vision, having been referred to me by Dr. Gruening. There was paralysis of the rectus externus muscle and slight limitation of the upward and downward movement of the eye. Under prompt antisyphilitic treatment the condition seemed to be slightly improved; but the improvement was soon lost, and in spite of all further treatment no real progress was made. The process had evidently become stationary, and retrogression did not seem possible. After much temporizing the oculist determined to cut the muscles of the eye, and since that time the position of the eye has been corrected and the patient considers himself cured. The possibility of a relapse must, of course, be borne in mind.

2. SYPHILIS OF THE SPINAL CORD AND ITS COVERINGS.

Until a few years ago syphilis of the spinal cord was supposed to be a comparatively rare affection, but the researches of Rumpf, of Oppenheim, of Siemerling, and possibly my own of a few years ago, but, above all, the recent investigations of Erb, have proved that cases of spinal syphilis are almost as numerous as those of syphilis of the brain. Many of the cases which we now recognize to be cases of syphilitic disease of the spinal cord were diagnosticated formerly as cases of chronic myelitis, of primary lateral sclerosis, and as cases of secondary degeneration following an acute myelitis.

Pathological Anatomy.—The pathological anatomy of spinal syphilis is unquestionably very similar to that of cerebral syphilis. The disease may in rare instances start from involvement of the bone, as in an interesting case reported not long ago by Leyden (Berl. kl. Woch., 1889); but it is much more frequently due to the diffuse infiltration of the meninges, which leads to adhesions between the pia and the substance of the cord, and which may invade at times the substance of the cord, giving rise to varying degrees of specific myelitis. If we examine the spinal

cord in cases of lues spinalis we can detect easily the characteristic changes of syphilis in the blood-vessels of the pia and in those of the spinal cord.* But arterial disease does not, so far as we at present know, play the important rôle that it does in cerebral syphilis. If spinal syphilis is ever due to softening as a result of thrombosis of spinal arteries, or to destruction of spinal tissue by the oozing of blood from syphilitic arteries, the post-mortem evidence of such conditions has yet to be furnished.† We are safe, therefore, in asserting that spinal syphilis is largely the result of specific infiltration of the spinal meninges, or possibly of a specific meningo-myelitis. The specific process may attack any part of the cord. It may be strictly localized either in the cervical, in the dorsal, or in the lumbar regions, and it may involve all of these parts at one and the same time. It is sometimes most pronounced over the dorsal surface of the cord; in other cases, again, it is chiefly developed along the ventral surface. For some reasons, which we can not satisfactorily explain at the present time, the invasion into the cord takes place most frequently along the lateral columns. In some cases the posterior columns become affected, and in still other though by far smaller number of cases, the disease attacks the anterior horns. According to the chosen area of invasion, the symptoms will vary; hence, spastic paraplegia is a very frequent condition in spinal syphilis. In some few cases the sensory symptoms due to lesion of the posterior columns of the spinal cord, will be present, and these cases may closely simulate tabes dorsalis. In others, again, the flaccid form of atrophy associated with paralysis and with the reactions of degeneration, will point to an involvement of the anterior horns.

Symptomatology.—Spinal syphilis, like cerebral syphilis, aside from the localizing symptoms, which have a simple topographical value, is characterized by the variability of symptoms, by remissions, and, as I have shown in a paper on spinal syphilis not yet published, by the disproportionate relation between the widespread area of the disease and the very slight intensity of the process at any given area. It seems to me that by these general symptoms we shall be able to recognize the syphilitic character of spinal paralysis very much more readily than by other symptoms which simply indicate the anatomical extension of disease. A few typical cases of spinal syphilis, which I shall now recite, will enable us to study the symptoms very much better than we can by means of wordy descriptions:

CASE I.—Mr. C., aged fifty, referred to me by Dr. Gibney in September, 1891, and has been under treatment ever since. There was a distinct history of syphilis nearly thirty years ago, followed by constitutional symptoms. Patient has

* See plate accompanying this article.

† Since writing above some researches bearing upon this point have been reported in the Medical Week for April, 1893.

been married twenty-three years; wife has had no children; has been an active brain-worker for many years, but moderate in his mode of life. In November, 1890, he had an attack of illness, during which his right eyelid drooped and his left leg was paralyzed. In the course of a few weeks he recovered sufficiently to get about again. He also had *eczema* and shortly after this, and was treated by various physicians for the tertiary symptoms of syphilis. In the early part of 1891 he had a severe attack of influenza. A few months later, in May, 1891, he developed paresis of the right leg and a paresis of bladder and rectum. He recovered in two months and was once more active in business. Two weeks before I first saw him he was compelled to go to bed again, his legs having grown weak, and his bladder and bowels not acting voluntarily. The condition I found him in was a rather critical one. In addition to the complete spastic paralysis of both lower extremities there was also complete paralysis of both arms and hands. There was no increase of the wrist-elbow reflexes, but a decided tendency to atrophy of the interossei, particularly in the left hand. The knee-jerks were enormously exaggerated. There were extreme contractures of the adductors and flexors of the legs, the extreme condition of contracture of the posterior leg muscles inhibiting the ankle clonus. The pupils were normal, speech was normal, sensation in both lower and upper extremities was normal at the first examination. Electrical reactions of all nerves and muscles was entirely satisfactory. There was retention of urine and inability to evacuate the bowels. This group of symptoms has been materially modified from time to time. The involvement of the upper and lower extremities, with symptoms pointing to a very irregular invasion of the various systems of the spinal cord, left no doubt in my mind as to the nature of the trouble, and in spite of many discouraging circumstances I adhered to, and pushed, the mercurial and iodide treatment to the extreme. At first the symptoms increased in severity, the paralysis became absolute, and anæsthesias were soon associated with the paralysis. The anæsthesia was evident only in both feet and legs up to the middle of the leg, and over the sacrum and lower dorsal spine. There was no anæsthesia in the upper extremities, but very decided paræsthesia of all sorts.

Within two months of the beginning of treatment, while the condition of the lower extremities remained unchanged, the upper extremities recovered completely and have been entirely normal ever since. Scarcely had these symptoms been recovered from when the intensity of the process in the lower cord seemed to increase. A bed sore began to form, which, in spite of the most careful nursing, increased in size until it was large enough to put one's fist in. For fully eight months it was a threatening feature of the case, but finally healed completely under the surgical skill of Dr. Gerster. There has been gradual improvement in the paralysis, so that now, after much patient treatment, he is able to walk about with the assistance of his crutch and an attendant, with every prospect of regaining the normal use of his legs unless a sudden relapse should set in. All the anæsthesias have completely disappeared, the contractures are relaxed, the ankle clonus is now apparent, but spasmodic twitchings of the legs still occur frequently enough, while the bowels and bladder do not to this day act voluntarily. Several attacks of cystitis and rectal disease have been added to the difficulties of the case, but at this writing the patient is doing well.

Case II resembled the first in many particulars, and still has run a very different course :

Mrs. C., a lady, fifty-three years of age, having five children, all healthy and married, was first seen in June, 1891. She was in good health until two years previously, and extremely active in spite of her weight—nearly two hundred and fifty pounds. After the blizzard she had a troublesome cough, and for a long time did not feel well. In the spring of 1889 began to notice a heaviness in the left leg, which would remit at times, and then would grow worse again, so that she was accused of having an hysterical affection. The trouble was restricted to the left leg for nearly two years before the right leg became similarly affected. A few weeks before I saw her she was sent to Atlantic City, as the change of air might have a favorable influence upon her supposed functional paralysis. The first examination revealed a very different order of things: First, extreme and absolute spastic paraplegia; not a muscle of a toe or of the legs could be moved. Second, extreme contractures, so that the knees would be firmly clasped together, unless forcibly separated by a pillow. Third, violent spasmodic twitchings, which gave rise to excessive pain. Fourth, there was complete anæsthesia of both legs and as high up as a line passing two inches above the symphysis. Fifth, loss of faradic response without alteration of galvanic formula in all leg muscles and nerves. Sixth, no tendency to bedsores. Seventh, absolutely no trouble with bladder or rectum. The upper extremities were not affected. No history of traumatism or of unusual exposure, and, furthermore, no history of acute infectious disease.

In the absence of these predisposing conditions, and more particularly on account of the extreme spastic symptoms associated with disturbances of sensation and with changes in the electrical reactions (atrophy could not be made out on account of adipose tissue), without, however, any interference with vesical and rectal reflexes and no tendency to formation of bedsores, I made the diagnosis of a specific myelitis. No other pathological process is as selective as specific disease, for the symptoms pointed to involvement of the lateral columns, of the posterior roots or gray matter, and also to the anterior columns or roots on both sides, and yet the column of Clark and the more central gray matter were not affected. I inaugurated and have persisted in specific treatment up to the present day, with gratifying results, although the proof of any specific illness was a long time forthcoming. Some nine months after the beginning of treatment the lady's husband consulted me for very persistent headaches. Suspecting the nature of the trouble, I discovered not only that he had acquired specific disease many years ago, but that he had been under a distinguished surgeon's care for bone syphilis only a year ago. The further progress of the wife's case has been marked by a gradual restoration of the electrical reactions, by total disappearance of the anæsthesias, by the cessation of all contractures and of the spasmodic twitchings, as well as by the slow and steady diminution of the spastic paralysis. She has regained moderate use of all the muscles of the lower extremities, but is still confined to her chair, as her legs will not yet bear her tremendous weight; but I expect her in a few months more to learn

to walk, since single efforts at standing have been successful. I may here quote what I have said on another occasion, that I have not seen any but specific cases of spinal-cord disease running such a chronic course and yet showing a tendency to improve after the lapse of one or two years and even longer. I hold that in this case, next to the very remarkable improvement, the unequal development of bladder and trophic symptoms as compared with the intensity of the other symptoms is the most characteristic diagnostic feature.

Case III, which I shall now refer to, shows how the symptoms may vary according to the anatomical distribution of disease :

I saw a young man, aged twenty-six, in consultation with Dr. Lustgarten, of this city, October 14, 1892. The patient comes of very markedly neurotic stock, with a history of insanity in his family, having also one sister who is deaf and dumb. Four years ago he had acquired undoubted syphilis; since last spring has experienced difficulty in walking and in the use of his hands. There was also the history and evidence of paralysis of the right superior oblique. The pupils failed to react to light and during accommodation. At the first examination the young man was quite unable to lift himself up in bed. There was distinct atrophic paralysis of trapezii, infra- and supra-spinati, deltoid, and pectorals; also a paresis of the entire arms and hands, grasp being almost *nil*. All forms of sensation, particularly tactile and temperature sense, were very deficient, while pain and muscular sense were normal. This was true of the upper and lower extremities, extending upward as far as the lower margin of the ribs. The wrist and elbow reflexes could not be elicited. The lower extremities were much emaciated, more so on the right side than on the left. Great weakness was apparent, the patient being scarcely able to lift the leg an inch from the bed, and yet if put on his legs he could stand a little. There was no ataxia. The right knee-jerk was lost, the left knee-jerk very feeble. All superficial reflexes lost. There was no disturbance of vesical and rectal reflexes, no bedsores, but a severe burn over an anæsthetic area of the right leg. The diagnosis of widespread syphilis was clear to me, although the paralysis tended to the atrophic rather than to the spastic type. The good results of treatment were very evident. At my next examination—about two months later, December 6th—I found the patient able to sit up in bed and to walk about freely. The pupils now reacted to light, though sluggishly, and the muscles about the shoulder joints had recovered strength from the atrophic condition. Normal sensation had returned, leaving but a relatively small area of anæsthesia on the trunk; and it is worth noting that at a still later examination the area of anæsthesia had again increased, while all other symptoms had receded. The grasp of hands was nearly normal, and all muscles with the exception of the extensor groups in both forearms had been restored to their normal volume. Faradic response diminished but present in all muscles, even in the extensors, with the exception of the anterior tibial group of right side. Both knee-jerks can now be elicited by re-enforcement, and the mental condition has been much improved.

Four months after first examination patient was able to call upon me at my office, improved in every respect, walking without assistance, and simply using

a walking-stick to get about with. He was still affected with double vision in consequence of paralysis of the right superior oblique.

Barring the slight ocular trouble, this was a spinal case clearly enough, though of the atrophic and not of the spastic order. The involvement of the upper and lower extremities, the unequal development of symptoms, paralysis and anæsthesia, are very marked. Electrical conditions, the nutrition and the reflexes, and trophic disturbances are less distinctly present. There is no involvement of the bladder. I made the diagnosis of spinal syphilis with slight cerebral symptoms.

It will be seen from the preceding cases that spinal syphilis is characterized by a paraplegia which may be spastic or flaccid; that it may at times involve both the upper and the lower extremities; that the symptoms may vary in intensity; that the duration of time before recovery may differ very much in given cases; but that the realization of recovery, or rather the hopes of recovery, distinguish these cases materially from other cases of spinal-cord disease. Within the last year a short report of many cases by Prof. Erb, of Heidelberg, has created great interest in the study of spinal syphilis, since Erb claims to have found a special type of symptoms of disease which is invariably due to syphilis. Let us, therefore, stop for a moment to consider the symptoms of

ERB'S TYPE OF SPINAL SYPHILIS.

This type is to be recognized by the following characteristics: 1. The usual symptoms of spastic paraplegia with its peculiar gait, carriage, and movements. 2. The reflexes are very much exaggerated. 3. Muscular contractures slight as compared with the exaggeration of the reflexes. 4. Involvement of the bladder. 5. A slight but yet distinct disturbance of sensation. 6. Gradual onset of the disease. 7. A decided tendency to improvement. The following case from my own practice will illustrate this special form of spinal syphilis:

Dr. X., now practicing in Hot Springs, Ark., consulted me in the autumn of 1892. He is thirty-six years of age, married, has no children. He was formerly in good health. The first symptoms of fatigue came on after slight exertion in 1880. He began to look pale and was run down. He was living in Ottawa, Canada, for a time, and went to sea for a couple of years, but did not improve, and began to have rheumatic pains about the joints. He suffered some from dizziness, and after his return developed a very marked spastic gait, which has slowly increased up to the present time. A slight irritability of the bladder and loss of sexual power were the only symptoms from which he suffered at various times, but both these conditions are now normal. Headaches are his constant affliction. On further questioning I learned that one year after the onset of spastic symptoms he had some difficulty in speaking, associated with a numbness of the left side of the body. Once he had an attack of aphasia lasting twenty-four hours, and remembers a temporary weakness of the left hand. As a result of my examination I noted inequality of pupils; no other head or ocular symptoms. Grasp excellent in both hands, but very exaggerated wrist and elbow re-

flexes. Spastic gait with considerable rigidity, so that in walking the knees are pressed quite closely together. No anaesthesia anywhere, no trophic symptoms, no tremors, no scanning speech. I made the diagnosis of spinal syphilis, and then learned from the doctor that years ago he had inoculated himself with syphilis in the middle finger of the left hand. I urged repeated mercurial and iodide treatment, but these drugs have not relieved the spastic symptoms.

In this case we therefore have extreme spastic symptoms with contractions, slight involvement of bladder, no sensory symptoms, and no atrophic symptoms, proving much more the selective character of the specific process, the case resembling in most respects one of secondary degeneration after an acute and transitory traumatic dorsal myelitis.

We must concede that Erb's keen clinical insight has led him to the correct recognition of a frequent form of spinal syphilis; but I wish to caution the general practitioner as well as the neurologist against supposing that this type is the most frequent representative of spinal syphilis, or that the diagnosis of spinal syphilis may be incorrect in case the patient does not exhibit the symptoms which Erb formulates for his special type of disease. Erb's patients probably represent that very large class of cases of spinal syphilis in which the meningeal infiltration first invades the region of the lateral columns and passes but very little if at all beyond these white tracts. But of course it does not in any way include those numerous cases in which there is more or less widespread syphilitic myelitis, or in which the gray matter of the anterior horns, the central gray matter, or the posterior gray and white matter are invaded by the syphilitic process. It seems necessary to insist on this point, because indications are already rife that Erb's type is to be made *the* type of spinal syphilis, to which conclusion Erb himself has contributed by speaking of his type as "syphilitic spinal paralysis." Let us not forget that there are many cases of spinal paralysis which do not conform to Erb's type.

TABES AND SYPHILIS.

The question of the relation between syphilis and tabes dorsalis has given rise to many heated discussions, to much argumentation *pro* and *con*. On the one side we have Westphal, Leyden, and others, claiming that there is no more relation between syphilis and tabes than between syphilis and many other spinal-cord affections. On the other hand, we have Fournier, Erb, and more recently Pierre Marie in his brilliant book on the Diseases of the Spinal Cord (*Les Maladies de la Moelle*, Paris, 1892), maintaining that syphilis is by far the most powerful factor in the causation of tabes dorsalis. The view expressed by Erb many years ago, that "he who has not had syphilis is scarcely ever apt to have tabes," is borne out by the statistics of Erb and others published within recent years. According to Fournier's first statistics, ninety-one to

ninety-eight in every one hundred cases of tabes gave a history of preceding syphilis; in Erb's first statistics the proportion of syphilis was eighty-eight in every one hundred; Rumpf, eighty to eighty-five in one hundred; Althaus, ninety in one hundred; while Seguin, taking his cases from private practice, gave the statistics of only fifty-three in one hundred. It is interesting to put in juxtaposition with these numbers the statistics of Westphal, which amounted to but fourteen in one hundred. In view of the personal experience of every neurologist of the present day, the conclusion is inevitable that Westphal did not care to see the truth in this matter.

In order to drive the nail still more firmly, Erb, in the *Berliner klinische Wochenschrift*, No. 29, 1891, gave an account of three hundred and sixty-nine cases of tabes which he had observed since 1883; three hundred of these cases were of patients from the better classes of society, while fifty were of the class that go to make up clinical patients; nineteen of the cases were in women. Of the three hundred cases from the better classes proof of syphilitic infection was wanting in eleven per cent of all cases; the eighty-nine per cent of cases with distinct specific infection were further subdivided, and it was shown that symptoms of secondary syphilis were present in 63·3 per cent of all cases, whereas chancre only without secondary symptoms was present in 25·7 per cent. Among the lower classes examined by Erb the percentage of cases in which no evidence of syphilitic infection could be found was very much higher, namely, twenty-four per cent; symptoms of secondary syphilis were present in fifty-two per cent; cases in which the chancre was present without secondary syphilis amounted to twenty-four per cent. The only difference between these two classes of patients is practically in the number of those in which syphilitic infection could be positively established, which is equivalent to saying that the well-to-do classes observe their own condition very much more carefully than do the poorer classes. In view of such statistics as these, one can not possibly escape the conclusion that fully nine tenths of all cases of tabes are due to syphilis, and my own experience leads me to think that this percentage might well be placed even higher. In private practice I do not see one case in fifteen of tabes which does not give the full history of syphilis.

Tabes is relatively rare in women, but in women who have tabes the percentage of antecedent syphilis is even greater than in the case of men. Of all the cases of tabes in women that I have seen I have yet to come across the first one in which there was not distinct history of syphilis. Erb has also studied this question with reference to the profession and occupations of tabic patients, and he finds, as every one would expect, that the percentage is particularly low among the clergy, but the cases that he does report among the clergy have invariably been preceded by

syphilis. In order to prove that the proportion of syphilis in tabic patients is far greater than could be accounted for on the supposition of the general prevalence of syphilis, Erb has collected five thousand five hundred patients who were not suspected either of tabes or of the acute manifestations of syphilis, and among these he has found that only 22·5 per cent had had syphilis, so that we can compare this 22·5 per cent with the 89 per cent of syphilis in cases of tabic patients, and we have the irrefutable evidence of the preponderating influence of syphilis in the etiology of tabes.

This mooted question may well be laid at rest for all time. It will be of some interest, however, to inquire in what way syphilis produces tabes, and whether tabes is a true sequel of syphilitic infection, as Strümpell (*Neurolog. Centralbl.*, 1886) has recently insisted, or whether syphilitic disease simply predisposes to the development of sclerosis in the posterior columns of the cord. This question has reached a still more acute stage since Hoffmann and Kuh (*Arch. f. Psych.*, vol. xxii), Hoppe (*Berl. kl. Wochenschr.*, 1893), and others have reported cases in which a specific infiltration limited to the posterior columns of the cord has given rise to symptoms during life which could not be distinguished from typical tabes dorsalis. I have now in my possession the spinal cord of a man (case not yet published) whom I had presented to my classes as a typical case of locomotor ataxia, not a single symptom having been found which would have made one suspicious of any other condition, yet at the autopsy we found, instead of a typical posterior spinal sclerosis, a widespread specific infiltration up and down the cord, with special invasion of the posterior columns.

In a former paper I expressed the belief that those cases of locomotor ataxia which began with ocular palsies might possibly represent cases of spinal syphilis. While I have not yet obtained actual anatomical proof of this, I believe it to be well to keep this possibility in mind, and am certain that as our studies of tabes are continued we shall be able to make out a very definite set of cases, in which, although the clinical symptoms of locomotor ataxia are apparent, the diagnosis of spinal syphilis would be the more plausible one. This possibility should be specially considered in the cases just referred to, as well as in all cases of tabes that develop either in very young persons or very soon after specific infection. I quote from my article on Cerebro-spinal Syphilis: "I have recently seen in private practice three cases in which the symptoms pointed to tabes; in the one case the knee-jerks returned after having been absent for some months, girdle sensations disappeared, and the man is well and has had no return of the symptoms for five years. In the second case all the symptoms of tabes were present, except that the knee-jerks were unequal for a time, then became equal, but have remained weak. In a third case, in

which the clinical diagnosis of tabes was fully warranted, the one knee-jerk returned and the ocular paralysis (ptosis and abducens paralysis) disappeared as soon as the iodide treatment had been pushed to an extreme. A relapse of the symptoms was relieved in the same way."

In all these cases syphilitic infection had been established beyond the shadow of a doubt, and I repeat my conviction that these and similar cases are probably cases of spinal syphilis rather than of typical posterior sclerosis.

Another point of interest in connection with this matter is the length of time that had elapsed between the syphilitic infection and the beginning of tabes (Erb's statistics):

12.3	per cent	appeared within	1 to 5	years after infection.			
37	"	"	"	9 to 10	"	"	"
24.7	"	"	"	11 to 15	"	"	"
14.2	"	"	"	16 to 20	"	"	"
4.8	"	"	"	21 to 25	"	"	"
1.9	"	"	"	26 to 30	"	"	"
.7	"	"	"	31 to 33	"	"	"

It will thus be seen that a very large percentage appeared within the first six and the majority of the cases within the first fifteen years after the initial infection.

These figures could be materially altered, and the period of time would be shown to be still shorter, if those cases were taken into account which begin with loss of pupillary reflex after syphilitic infection, and which do not develop any other symptoms of tabes for some years to come; yet the appearance of the pupillary disturbance may well be considered to have been the beginning of tabes.

III. MULTIPLE CEREBRO-SPINAL SYPHILIS.

I wish in this connection to call attention to this frequent form of syphilitic trouble, upon which I dilated at some length in a paper published two years ago (*N. Y. Med. Journal*, Sept., 1891). While we may endeavor to localize cerebral or spinal syphilis, we shall find in a very fair proportion of cases symptoms pointing to an involvement of both the brain and the spinal cord. In a case reported with autopsy the special features were: first, a spastic paralysis of the cerebro-spinal type; second, recovery from this attack; third, a second attack of spastic paralysis of upper and lower extremities with cranial-nerve involvement. The history of this case is of sufficient importance to warrant its reproduction here.

R. K., a Lithuanian, aged thirty-seven years, married eighteen years, was an inmate of the Montefiore Home when I took charge of the service, in November,

1890. From a careful history taken for me by the house physician, Dr. Rosenthal, I learned that her father had died of phthisis fifteen years ago ; her mother, five sisters, and one brother were all alive and well ; her husband is also alive and said to be in good health. The patient has had two children—a girl, born seventeen years ago, who had some eruption when one year old, which lasted six months ; this child died at the age of two years, of croup ; a son, aged fifteen years, is living and healthy.

As a child our patient enjoyed good health. At the age of sixteen years she had an eruption over her chest and abdomen, together with ulcers on her legs ; no history of other specific symptoms could be obtained. Her first child was born in the second year after marriage ; there were no miscarriages or stillbirths at any time. Patient has been in this country six years. Her husband came to this country eight years previously—say, five years after their marriage. During the term of separation from her husband she was living in Moscow, where she passed through an acute febrile affection, probably typhoid. After coming to this country, six years ago, she began to complain of pains in different parts of the body, more particularly in clavicle and shoulder, also over the liver. There was no swelling as far as she remembers, but she recollects having ulcers on both legs at that time ; as soon as one healed another would develop, and so on for four or five months. She had some affection of the throat, lasting about two months. During the summer of 1889 she suffered from headaches and vertigo, fell frequently in the street, but claims never to have lost consciousness. Her mental condition was normal, but she was much distracted by pains and increasing weakness in her legs. In February and March, 1890, she had true projectile vomiting. In April, 1890, she became bedridden, and was sent to Mount Sinai Hospital, where she remained seven weeks and was subjected to antisymphilitic treatment. Her symptoms at that time consisted of headache, vertigo, absolute paraplegia of lower extremities, marked hiccough, obstinate constipation, and retention of urine ; catheter was used. In addition, she had photophobia and difficulty of speech ; mental condition was normal. Sight and speech disturbances disappeared after fourteen days. When dismissed from hospital (after seven weeks) was much improved. For three weeks remained comparatively well ; then the headaches returned, and she fell repeatedly, probably in consequence of weakness of legs, became constipated, but bladder remained normal. In September developed ptosis of the left eye and severe pain over left half of head. In October developed a paralysis of left arm and hand, and, after a few days, paralysis of both lower extremities ; became confused in mind and almost demented ; mental condition was characterized also by severe depression ; developed incontinence of urine and fæces. In this condition was brought to the Montefiore Home late in October, 1890. The house physician reports that he found left ptosis, spastic paraplegia, atrophy of both halves of tongue, and exaggerated reflexes. I first saw her November 4th, three days before death ; she was semi-comatose, but I could make out left ptosis and complete ophthalmoplegia externa and interna of left side, partial on right side ; spastic paraplegia of upper and lower extremities, with contractures and increased reflexes, more marked on left side than on right. Tongue was atrophied. Sensory examination could not be made, owing to semi-comatose condition, nor could facial paralysis be accurately made out ; there was, however, no distortion of face. The coma deepened, respiration became irregular, and patient died November 7, 1890.

I made the diagnosis of syphilitic disease of the central nervous system (meningeal infiltration), with special deposits at the base of the brain.

The autopsy was done late at night, within twelve hours after death. The skull and spinal canal only were opened. The calvarium was thin, and in one or two places almost transparent. The dura was not adherent to the brain; the pia over the convexity was congested, but not adherent to any part of the cortex, nor were any gross changes noticeable until the brain had been removed. At the base the great thickening, almost leatherlike, of the pia in the interpeduncular space was very evident; the optic nerves were very much swollen, while all the other nerves appeared thinner than normal and tightly constricted by the thickened pia; the pia could not be removed from any part of the crura, pons, or medulla without injuring these parts. Through the pia the gummatous lesion in the right half of the pons could be detected; this had evidently extended also into the left half. On sections through the pons these changes can be best studied. The spinal dura was found very much thickened; otherwise the gross appearances were normal, except that at various points the areas of degeneration were most distinctly marked, and it was also plain to the naked eye that the ordinary limits of degeneration were not respected. In Plate XX, Fig. 4, it will be seen that a very large area is diseased. Microscopically, it was evident that the syphilitic infiltration had insinuated itself as far as the area of secondary degeneration. The brain and cord were hardened *in toto* in bichromate-of-potassium solution of increasing strength, and later on in alcohol. Sections have been made through the cortex, the ganglia, the pons, the medulla, and at various levels of the cord. A very careful examination was also made of the vertebral and basilar arteries.

Microscopical Examination.—The vertebral and basilar arteries showed typical syphilitic arteritis. In all specimens the lumen was very much narrowed by a small-celled proliferation of the walls; in some the intima was the part most affected, but in other specimens, and often in different parts of the same section, the intima had been but little encroached upon, while the membrana elastica was lost in the mass of granulation tissue and the adventitia was much thickened, showing cellular proliferation. Sections through the cortex, ganglia, and quadrigeminal region did not present any morbid changes in the brain substance.

In the pons, on sections stained with picrocarmin and according to Weigert's hæmatoxylin method, the lesion destroying the right pyramidal tract, and invading the left, was made evident (Fig. 1).

This area is marked by a typical infiltration which has led to disintegration of the fibers and of the neuroglia; on several sections much of this detritus has fallen out, leaving gaps in the section; the pontine pia is everywhere adherent and infiltrated; the blood-vessels show specific alteration of their muscular coats, the intima being very much increased and the lumina of the vessels being partially or wholly occluded by clots. In the medulla and throughout

the spinal cord as low down as the middle lumbar region we find degeneration of both lateral columns and both anterior columns, the degeneration of the latter, however, not passing below the lower dorsal. But at all levels of the brain and spinal cord below the pons typical syphilitic changes can be made out; adherence of the pia to the substance of the pons, medulla, and cord, with here and there special gummatous infiltration into the substance of the cord; this is specially marked on sections through the medulla (Fig. 2), and the mid-dorsal and mid-lumbar segments (Figs. 4 and 5). The posterior columns are free. The pia is thickened throughout by marked round-celled infiltration, and the blood-vessels are often infiltrated, thickened, and filled with blood-clots. The pathological diagnosis reads meningitisluetica cerebro-spinalis; and it is worth while noting, in contrast with the findings of Oppenheim, that in this case the dura had suffered but little, while the changes were much more marked in the pia throughout its entire length. We might, therefore, go but little astray if we made the diagnosis of leptomeningitisluetica cerebro-spinalis.

Comparing the history of this case with the pathological findings, we must infer that there was at first a general specific process affecting simultaneously the brain and spinal cord; in consequence of antisyphilitic treatment, or possibly in spontaneous fashion, the specific process was checked for a time; it then took a fresh start, and finally resulted in special deposits in the pons and cord. Such cases as the above are not infrequent in practice, and are to be attributed to the very common occurrence of meningeal infiltration all along the central nerve axis. Brain and cord may be distinct anatomical and physiological structures, but from a pathological point of view they are one, and subject to the same morbid processes.

MENTAL DISTURBANCES FOLLOWING SYPHILIS, INCLUDING DEMENTIA PARALYTICA.

Among the milder forms of mental disturbances due to syphilis, none is more frequent than hypochondriasis. I do not, of course, refer to the syphilidophobia in patients who have not had the initial sore, but to a very similar mental state which affects those who have become infected and who are constantly watching for the further manifestations of syphilis. Every pimple that appears is considered to be due to the action of the syphilitic virus. The patient is fearing that the next eruption will come in the face; that the nose may be disfigured; that he will have eye disease which will stamp him as a syphilitic individual before the entire world; in short, he is constantly fearing the appearance of symptoms, all of which are possible, and, from the mere fact that the possibility of their occurrence can not be denied, becomes confirmed in his hypochondriacal notions. A severe and lasting hypochondriasis is often engendered, but, if I am to trust my own experience, only in those in whom there has been a distinct neurotic tendency before the acquisition of syphilis. If a

neurotic history is absent, the hypochondriasis is apt to disappear even in the face of actual syphilitic manifestations. Thus only a few months ago a young man was referred to me by his physician in Hamburg, for observation on account of the possible development of secondary syphilis and the much more probable development of a marked hypochondriasis. The young man had become extremely observant of himself, had all the aches and pains to which text-books and doctors had ever referred, and was in mortal dread that the world would soon be able to know that he had acquired syphilis; when, lo and behold! a very distinct mucous patch appeared upon the tongue, then in the corner of the mouth, and the syphilis could have been apparent to every one. But the young man's good neurotic history helped him to "face the music," and in a very short time he determined to set to work to have his syphilis cured and to disregard every other sentiment in the matter. I have no doubt, if he had been predisposed to mental disease, that upon the appearance of secondary symptoms his hypochondriacal tendency would have been markedly increased.

Maniacal excitement occasionally follows upon syphilitic infection. I have seen this in a young man, twenty-one years of age, who had acquired syphilis six months before my first acquaintance with him, when he was in an attack of acute mania. No special cause could be found; alcoholic and sexual indulgence were not excessive, and there was no other explanation for this state, except that his general condition had deteriorated a little in consequence of the rather severe treatment he had been subjected to for the cure of syphilis, his stomach having been thoroughly upset by the constant use of mercurials and iodides, and in this way his general nutrition had suffered very much. As I concluded that he had had enough specific treatment for a time, I had him carefully fed and watched, and within a period of three weeks every symptom of mania had disappeared, and the man made a full recovery. This can hardly be called a case of true syphilitic mania, for I have in the history insinuated that the general depreciation of nutrition was more apt to have been the cause of this mania than the syphilitic virus itself.

Temporary or Transitory Dementia is a much more frequent manifestation of syphilis. I do not find this form distinctly recorded in any of the ordinary works on syphilis, and yet I have seen at least three examples of it within the past year in private practice, and therefore wish to make a short record of this form in this connection.

The patients have been men, under thirty-five, each one of whom had acquired syphilis a few years previously. In two of them there had been some alcoholic indulgence and also some sexual excesses. The patients were suddenly seized with visual and auditory hallucinations, with very slight fever, which lasted for a few days, followed by a condition of men-

tal confusion which deepened into semi-stupor, in which the patient remained for some weeks, and then made a complete recovery, barring a very slight mental weakness in one case—to be sure, the case of a man who, before he had acquired syphilis, and before these mental symptoms had appeared, had not showed any marks of mental brilliancy. In all these cases there was absolute sluggishness of the pupils, both to light and during accommodation, during the period of confusion and semi-stupor. In one of these cases the knee-jerks which were absent have now returned; in the other two the knee-jerks were absent from the very start and have remained so to this day, although the mental condition has gone on to complete recovery. In addition to this transitory dementia another form occurs, also due to syphilis, which may well be spoken of as the terminal dementia following all sorts of cerebral accidents due to syphilis. Thus patients who have had ocular palsies, persistent headaches, several attacks of hemiplegia, possibly a cerebro-spinal paralysis, consisting of paraplegia of upper and lower extremities, together with cranial nerve involvement, and double optic atrophy leading to complete blindness, pass into a condition of gradually deepening dementia—a dementia which seems to be distinguished from all other forms by the very remarkable remissions that occur. Thus in one case now under observation the dementia had become so extreme that the patient was practically nothing but a vegetating organism; his mind was a complete blank, yet when it was least expected he rallied and recovered to such an extent that he was again able to read his newspaper, to converse fairly intelligently with his surroundings; but remained in this fortunate condition only a very short space of time, when he again sank into a condition of complete dementia, in which he now is, and probably will remain to the end of his days. It may be claimed by some that these cases are simply modifications of dementia paralytica; but there are so many points of difference, and they depart so widely from the ordinarily received type of dementia paralytica, that we may well consider them worthy of a special classification.

Dementia Paralytica.—This is by far the most frequent form of mental disturbance due to syphilis, and gives rise to very much the same questions as were discussed with regard to tabes. The clinical symptoms of dementia paralytica are familiar to every one; they consist, in brief, of a gradual deterioration of all the mental faculties, of a change in the person's character and habits; delusions of grandeur, often of the most extravagant sort, are apt to be present, but absent also in not a few instances. Apoplectic and epileptiform attacks are apt to occur, readily increasing the dementia which has been gradually coming on. Together with these mental symptoms we are apt to have unequal pupils, the Argyll-Robertson pupil, or possibly complete immobility of the pupils; tremor

of speech and of tongue; exaggerated reflexes in many of the cases; diminished or abolished reflexes in others, particularly in those tending to the development of tabes. This complex of symptoms is unmistakable, and yet cases occur in which the diagnosis, particularly in the earlier stages, can not be readily made, and the question very often arises whether in a given case the diagnosis shall be of dementia paralytica (general paresis of the insane) or syphilitic dementia. This alone points to the acknowledged close resemblance between the two forms of disease, and it would be better to regard dementia paralytica rather as a convenient clinical term for a large number of cases than as a disease which has rigid pathological limitations. The typical dementia paralytica is due to a chronic form of meningitis of the convexity, finally leading to atrophy of the brain. If we remember that syphilis of the convexity is very apt to result in a cortical encephalitis or in a meningo-encephalitis, we have good reason to expect that the symptoms of cortical brain syphilis and of dementia paralytica should be very much the same. Mendel (*Progressive Paralyse der Irren*, Berlin, 1880) has shown by his experiments on dogs by the use of centrifugal force, that persistent hyperæmia within the cranial cavity, and particularly of the cortex, will finally result in a condition which strongly resembles progressive paralysis in man; and if we keep in mind that syphilitic disease leads to marked disturbances of circulation through its effect upon the arterial walls, we have a hint given us how syphilis may lead to the development of dementia paralytica.

But aside from these reasons derived from a study of the pathological anatomy of these two conditions, there are sufficient clinical studies which go to prove that there is a strong causal relationship between syphilis and paralytic dementia. First of all, the very frequent development of tabes after dementia paralytica and of dementia paralytica after tabes, proves the close relationship between these two diseases; and since tabes is beyond a doubt a form of syphilitic disease, there is sufficient ground for thinking that dementia paralytica bears the same etiological imprint. While no one has as yet given such careful statistics of dementia paralytica as Erb has of tabes, the percentage of syphilis in cases of dementia paralytica has been stated to be high enough by a number of different observers. Fuerstner,* who is opposed to the relation of syphilis to dementia paralytica, claims but thirty-two per cent of syphilitic infection in cases of dementia paralytica, while Snell claims seventy-five per cent of syphilitic infection in his cases, and Rohmell, 77·2 per cent. Obersteiner made a good point by proving that syphilis was present in 21·6 per cent of cases of general paresis, but present in only 4·1 per cent of other psychoses; and the statistics of other observers, Lange, Nasse, etc., have

* Cf. Rumpf's Monograph, p. 283-286.

fully borne out these statistics. Rumpf has analyzed very carefully fifteen cases; in three of these syphilitic infection was improbable; in ten cases, however, there was positive proof of specific infection.

My own experience also is in entire agreement with those who consider syphilis to be of quite as much importance in the etiology of dementia paralytica as it is in that of tabes. The same is true of dementia paralytica as might have been said of tabes, that in cases occurring particularly early in life syphilis is invariably present.* Thus I have the records of a case of a young man of twenty-four, who passed into a very typical general paresis three years after the initial infection; and of another patient of only twenty-three, who had acquired syphilis at the age of twenty-one, within six months thereafter developing symptoms of irritability of temper, unusual extravagance, loss of memory, and soon went into a rapid decline, in which not a single symptom of typical dementia paralytica was wanting; the patient finally dying in Bloomingdale Asylum within two years of the first onset of mental symptoms. In both these cases the neurotic element was marked, as both young men came from families in which mental disease is a very frequent occurrence. Although it is generally believed that hereditary predisposition has very little to do with the causation of general paresis—a view to which I am willing to subscribe—it is still evident enough that hereditary predisposition, when added to syphilitic infection, proves fertile soil for the development of general paresis.

The above remarks will justify us in having considered dementia paralytica in a special chapter on syphilis of the central nervous system. The important point will be to decide in a given case whether the diagnosis of genuine dementia paralytica is the more probable one, or whether the case may not be one of brain syphilis, or, better said, syphilitic dementia. The only points of differential diagnosis that are at all reliable would be these: First, the very early development of the symptoms after the initial infection; next, the prolonged remissions, which, after all, are never quite as marked in typical general paralysis as they are in typical cases of syphilitic brain disease; and, lastly, the association of symptoms known to be due to syphilis rather than as a part of general paralysis would clear up the diagnosis. Let me add the following case, which was instructive because the young man was supposed by the experienced physicians at Bloomingdale to be a typical case of dementia paralytica, and yet recovered his mental faculties completely, and for several years afterward presented the typical symptoms of multiple cerebro-spinal syphilis:

* Strümpell reported a few years ago the occurrence of dementia paralytica and tabes in a girl of thirteen (*Neurol. Centralbl.*, 1888).

In April, 1890, I was asked to see D. S., a young man thirty-one years of age, single, who had led a very eventful life; had been a heavy drinker, and had acquired syphilis, for which he had been treated. Three years before he became acutely demented, and was taken to Bloomingdale Asylum, where he was entered as a case of general paresis. After a stay of eighteen months he had sufficiently improved to be allowed to leave the asylum. I saw the young man about nine months later, when he told me that while in the asylum he began to notice a great difficulty in walking. On examination, I found spastic paraplegia of lower extremities, no marked involvement of upper extremities, great increase of reflexes in all four extremities, very marked and constant tremor of the hands (not merely intention tremor), marked facial tremor, and a peculiar speech disturbance, which reminded one in part of general paresis, and was something akin to the scanning speech of multiple cerebro-spinal sclerosis, yet different from both.

I was willing at one time to consider the case a multiple cerebro-spinal sclerosis (nystagmus, however, was absent), until a very marked remission occurred, during which the mental symptoms cleared up entirely, and the patient began to read and write, as of old, with absolute correctness. He spoke intelligently of all things, and his spastic paraplegia made considerable improvement under antisyphilitic treatment. This remission was not destined to last very long, for after a few months the old symptoms returned in full force, speech became very heavy again, the spastic condition increased, the hands became tremulous, and marked hypochondriasis developed, which disappeared again.

IV. SYPHILIS OF THE PERIPHERAL NERVOUS SYSTEM.

From a practical point of view this section is the least important of those we have to deal with, since the cases of syphilis of the brain and spinal cord are at least ten times more frequent than those in which the manifestations of syphilis are exhibited, chiefly in the peripheral nerves. A specific primary process in the peripheral nerves is a still greater rarity; such cases as we do see are the result of a gumma, or of infiltrated glands pressing upon part of a nerve plexus. In keeping with the general structure of the peripheral nerves we may have disturbances of sensation, subjective and objective; and we may have paralysis or disturbances of some one of the special senses as a result of syphilis.

Syphilitic neuralgia is a diagnosis not infrequently made, but I have very grave doubts as to the frequency of this condition, and believe that the accidental co-operation of other causes is often overlooked. We may and often do find marked alcoholic tendencies in persons who have had syphilis; a neuritis developing in such a person need not, therefore, be of specific origin, and is much more probably a simple alcoholic neuritis. It is well to remember, however, that the co-operation

of two distinct etiological factors, like alcohol and syphilis, leads to more disastrous results than if one alone were in question. Nor is it fair, on the other hand, to infer too much from the therapeutic test, and to claim that every trigeminal neuralgia, for instance, which has resisted other forms of treatment and then yields to the iodide or mixed treatment, is an instance of a syphilitic neuralgia.

The headaches that are so characteristic of syphilitic disease may be considered the clearest proof of the occurrence of neuralgic affections in the wake of syphilis, for the headaches are due to the disease of the meninges, and the meninges are supplied by the ramifications of the trigeminal nerve. It is not always easy to distinguish the frequent form of syphilitic headache from those that are more distinctly of a neuralgic character; but it is reasonable to believe that the diffuse headaches of syphilis are due to a general infiltration of the meninges of the convexity, whereas the typical trigeminal neuralgia that sometimes occurs in syphilitic subjects may be caused by patches of meningeal infiltration at the base around the fifth nerve, at its point of emergence from the base of the brain. The occurrence of some slight motor disturbance in connection with sensory symptoms might be expected in such cases. Aneurisms of the internal carotid, which might be considered an expression of syphilitic disease, have been known to be the direct cause of trigeminal neuralgia. Romberg has reported one such case that is of unusual interest. I myself have recently had an opportunity of seeing an uncommonly interesting case of this description, in which the diagnosis of aneurism was made by exclusion, and the possibility of syphilis as the cause of aneurism had to be conceded. Although the diagnosis is not a positive one in this case, I will give the clinical history, in view of the rarity of this special form of disease:

Mr. A. K., sixty years of age; married; four children; sixteen years ago had perityphlitis; no second attack. Has been a moderate smoker, moderate drinker, and denies ever having had syphilis; had gonorrhœa twice. Last February had intense pain over the right eye, and in the course of one week from the onset of this pain developed an anæsthesia in the entire right half of the face, first over forehead and then over cheek, and finally over the right half of the tongue. Soon after this began to experience difficulty in mastication. In May went to Europe and consulted Professor Erb. At times he had spasms of masseter muscles, so that he could not separate the jaws. Noticed no weakness of upper or lower extremities, no difficulty in micturition. The man is active and unusually vigorous for his age. The examination revealed absolute anæsthesia over right frontal region, right cornea and conjunctiva, middle of right half of tongue, and middle of right half of mouth. The right pupil very sluggish to light and accommodation, left pupil less so. All ocular movements perfect. Central defects of vision and limited vision. No facial paralysis. Grasp of both hands good. Knee-jerks normal. All electrical reactions good except in the right temporal and masseter muscles, which are largely atrophied. The central defect of vision

in this case was accounted for by the existence of retinitis pigmentosa, which Dr. Knapp asserts is sufficient to account for the peculiar defects of vision.

From the slow course that the case had taken, from the entire absence of all signs which would lead to the inference that there was malignant disease, and in view of the fact that all the symptoms pointed to a compression of the entire trigeminal nerve at the base, I concluded that an aneurism of the internal carotid was the most probable diagnosis, with the probability also of latent syphilis as the cause of this rare association of symptoms.

Rumpf reports an unquestionable case of syphilitic neuralgia of the trigeminal nerve in which the microscopical diagnosis was made during life by an examination of a portion of the resected nerve. In this case there was a distinct diminution of sensation in the distribution of the second branch of the trigeminus. The pain was persistent, and resisted every form of medical treatment. The history of the patient brought out the fact that some twenty years previously he had acquired syphilis. He was thereupon placed upon very large doses of the iodide of potassium which, however, were of no avail, and finally the operation was undertaken by Prof. Trendelenburg. The operation was not entirely successful, for a proliferating mass starting from the bone had encircled the nerve and could not be extirpated as fully as was desirable. The neuralgia was not improved by the operation, and the patient died four months later with cerebral symptoms. Rumpf, who made the microscopical examination, states that the proliferating mass was a true granulation tumor, and that the nerve was permeated by granulation tissue. In this case the blood-vessels were not diseased, and Rumpf thinks that it is due to this fact that the disease resisted medical treatment; he describes the pathological condition as a perineuritis syphilitica.

Neuralgic affections of a specific order also occur in the course of the cervical, the brachial, and the lumbar plexus; even sciatica may occasionally be the expression of syphilitic disease. Here, again, Rumpf supplies an interesting study. He reports a case of a woman sixty-three years of age who complained of typical right sciatica. The pains were particularly severe between the hours of 1 and 4 A. M. The woman had been married since the age of thirty-five, and had one healthy daughter. Her husband, too, was healthy. The treatment of the case was entirely unsuccessful until the patient herself confessed that at the age of thirty she had become infected with syphilis. She was given large doses of iodides and disappeared from treatment, but a little while later was run over and killed. At the autopsy, Rumpf found an atheromatous condition of the aorta with slight aneurism formation. There was a decided dilatation of all the veins in the spinal canal around the lumbar cord and the cauda equina. The walls of the veins were distinctly thickened. Rumpf thinks

this sufficient proof, together with the changes in the aorta, of syphilitic disease. It is to be regretted, however, that the sciatic nerve was not examined, for if the sciatica was due to the central lesion, there would in all probability have been pain along other divisions of the lumbar plexus.

I wish to direct especial attention to the very frequent vague nerve pains in syphilitic subjects. These pains constitute a very distressing symptom in many of the cases of syphilis of the central nervous system, and in one case previously alluded to in this paper, paræsthesiæ in the upper and lower extremities, and above all constant burning sensations in the toes and heels, are as annoying as any other symptoms which the patient presents. These pains are apt to increase, together with a change in the other symptoms, showing an exacerbation of the morbid process; and I have always regarded the occurrence of such pains as an additional reason either for increasing the specific treatment or for subjecting the patient to a renewed course of treatment.

Syphilitic disease of the cranial nerves we have referred to before, and need not be considered in this connection.

Diagnosis.—The differential diagnosis of syphilitic disease of the nervous system could not be attempted without reviewing all the clinical facts reported in previous sections of this chapter. In this connection I merely wish to repeat the caution that the diagnosis be made upon the clinical picture presented in a given case; whether we can prove, or the patient conceals, the existence of initial infection, we should be able to recognize the clinical types of syphilis of the nervous system independently of the etiological factor. In case initial infection is well established, we should not be misled into the error of attributing all the nervous symptoms with which the person may happen to be afflicted to syphilis, for there is no reason under the sun why a person who has had syphilis may not have any of the many forms of nervous disease to which those who have never had syphilis are liable; and, on the other hand, we may safely make the diagnosis of cerebral or spinal or cerebro-spinal syphilis if the clinical symptoms correspond to a given and well-recognized type of disease, whether or not the initial infection can be proved to have occurred, and if remarkable remissions occur upon treatment by mercury do not consider this absolute proof of the specific nature of the disease. The following is a very remarkable instance of this kind:

Mr. K., aged forty, a sufferer for many years, has had attacks of left hemiplegia, with persistent headaches, and occasional epileptiform seizures (general convulsions); has a tremor which was diagnosticated by several eminent European *confrères* as that of multiple sclerosis; it was probably a hereditary form of tremor. In the autumn of 1891 headaches became more intense, epileptic seizures more frequent; went into a condition of coma. I was consulted, and urged very vigorous mercurial inunctions. Improvement was rapid; all symptoms

disappeared; "Never felt so well in my life"; relapse set in some weeks later, and patient died. At the autopsy I found not a gumma, but a large *glioma* of the fronto-parietal area of right side.

Prognosis.—It has been the custom to give a favorable prognosis in every case in which distinct specific disease has been diagnosticated. This is not a safe rule to follow, for it should be remembered that a hæmorrhage or thrombosis, for instance, due to syphilitic disease of the arteries, is fully as grave a matter as though these conditions were due to atheromatous or other disease of the blood-vessels, and, if anything, the danger of relapses is even greater in the case of specific disease than of the other morbid processes.

In his brilliant lectures on syphilis of the nervous system, Gowers (*Syphilis of the Nervous System*, 1892) takes an extremely pessimistic view of specific disease affecting the brain, the spinal cord, or both combined. He urges, and supports his argument by substantial facts, that the disease is practically an incurable one; that we may cause the manifestations of the disease to disappear for a time, but that the disease itself, while it may remain latent for a long period, is never thoroughly eradicated from the body. Every one will be ready to concede the truth of this statement; but, on the other hand, it is safe to say that the manifestations of syphilis yield to the proper treatment far more frequently than the same symptoms would if due to any other morbid process. I beg the reader to recall those serious cases, particularly of spinal-cord syphilis, to which I have referred above, in which most remarkable improvement had set in as a result of antisyphilitic treatment—an improvement which would never have resulted if syphilis had not been the causative factor of the disease. I can not, therefore, share Gowers's pessimism, and am rather inclined to urge a more favorable prognosis because of the syphilis, but would always insist upon the possibility of relapses of cerebral and spinal symptoms whenever the disease is distinctly due to specific infection. Let us not forget, also, that much of the damage done by syphilitic disease may be beyond repair, and that to this extent the prognosis becomes a serious one. If softening due to thrombosis in a cerebral artery has given rise to a hæmorrhage which has resisted every form of treatment for a period of many months or even of years, or if the symptoms in a given case of spastic paraplegia resist all treatment for a long period of time, if there is evidence that secondary degenerations have set in, medicinal treatment may have some influence in the way of checking the further spreading of the disease, but it can not undo the area of softening which has been established, nor the secondary degenerations which have followed upon an initial specific focus of disease in the brain or spinal cord. The prognosis, too, in any case will depend very largely upon the general condition of the patient,

upon the stage of the process at the time of observation and treatment; and he who sees many cases of syphilitic disease of the nervous system will come to the conclusion that no cast-iron rule can be established, but that each case must be judged according to its individual merits. But I am willing that a somewhat more favorable prognosis should be entertained because of the preceding syphilitic infection, since this hope of greater improvement will lead to far more persistent and more energetic methods of treatment.

Treatment.—Whether syphilitic disease happens to attack the brain, the spinal cord, or the peripheral nerves, the treatment will and should be very much the same. Since disorders of the nervous system following upon syphilis have generally been regarded as tertiary manifestations of syphilis, it has been the rule to maintain that the iodides alone were the all-powerful drugs. It is for this reason that the value of mercurial treatment is not as fully recognized as I think it should be. From my own experience with this class of disorders, to which I have given considerable thought, I am willing to say that I should prefer to do without the iodides rather than without mercury; but the two combined unquestionably yield better results than either one will if given singly. The method of administration is of much importance. As for the iodides, I have been in the habit of using the iodide of sodium to the exclusion of the potassium salts. I base this practice upon the unfavorable action, if long continued, of all potassium salts upon the heart; and since in so many cases of these disorders the circulation is weak enough, it is well not to add to the injury already done, by the drugs which we exhibit. The iodide of sodium is best given in a saturated solution, each drop containing a grain of the salt. Begin with ten drops of this saturated solution, given three times daily in some alkaline water before meals, and long enough before meals to enable thorough absorption to take place before other ingesta are carried into the stomach. I prefer to give the drug in Vichy, in Selters, or some other alkaline water rather than in milk. According to the condition of the patient, the dosage can be increased by two to five drops daily until one hundred to one hundred and fifty drops three times daily have been reached, or until the improvement that has set in makes it unnecessary to advance to the higher dosage. If no improvement results after the patient has reached these large doses, say of one hundred to one hundred and fifty grains three times a day, it is well to quit this form of treatment for a time; but another attempt should be made in exactly the same way, beginning with smaller doses and gradually advancing; and others will experience what I have seen again and again, that these renewed attempts at this treatment will finally bring about a decided change for the good in the symptoms of the patient.

In addition to the iodide treatment, begin at an early day with inunctions of mercury. In children, I am fond of using a ten-per-cent oleate of mercury; in the adult, the unguentum cinereum is decidedly the best form in which to administer mercury. I can not insist strongly enough upon the advantage of inunction treatment, for I am firmly convinced that mercury is not as active if taken into the system in any other way, and I will even go to the length of stating that I have never been able to convince myself of marked improvement in any case in which mercury was administered *per os*, either in the form of calomel, of corrosive sublimate, or of the protiodide of mercury. It is also a matter of common experience that the inunctions of mercury can be pushed to a very considerable extent without producing any salivation, the patient having one to two drachms of the blue ointment rubbed in daily for a period of many weeks and even months; whereas the administration of comparatively small doses of the mercurial salts by the mouth is very apt to produce disagreeable salivation in a comparatively short period of time. It is because of this salivation and on the ground of inefficiency that I object to the old and time-honored method of prescribing the iodides with mercury in the form of a solution. The good that results from this medication I am confident is due to the iodides alone.

In addition to the administration of the mercurials and the iodides, the proper treatment of syphilis of the nervous system requires a careful observation of the general nutrition of the patient. In almost every case in which the specific treatment has had to be persisted in for weeks or months, it would be necessary to quit this treatment for a time and to place the patient upon a treatment of blood and nerve tonics. For a time, iron, arsenic, quinine, and even strychnine can be substituted with marked benefit to the patient, who in a few weeks may have improved sufficiently to warrant the renewal of specific treatment.

The diet should be carefully attended to; it should be nutritious, in as small bulk as possible, and should not contain any articles of food which are apt to impose unusual tasks upon the gastro-intestinal tract. Let the diet consist of meat, fish, eggs, milk, the plain vegetables, little starchy food, no salads, and no sweets.

Hygienic measures should be carefully regarded, and, above all, it will be found advantageous to institute regular hydrotherapeutic measures, including warm baths several times a week, and the more tonic lukewarm, followed by colder washes and douches, which may well be given every morning immediately upon rising.

It is the combination of general hygienic and hydrotherapeutic measures, together with mercurial and iodide treatment, that has placed various watering-places in high favor with the medical and the general public. In this country the Hot Springs of Arkansas are the Mecca of patients

suffering from any form of syphilitic disease of the nervous system. In Europe, Aix-la-Chapelle and Nauheim are at the present day the resorts most frequented by this class of patients. There would be naught but commendation for these places if a little more discrimination were shown in the treatment of specific disease of the nervous system, and if the physicians in charge of these various springs would learn to treat cases upon their individual merits and according to the needs of the individual patient.

EXPLANATION OF PLATE XX.

Fig. 1, section through pons, showing gummatous infiltration (*g*) of ventral portion. Specimen stained with Weigert's hæmatoxylin. Low power.

Fig. 2, ventral portion of medulla, showing thickening of pia and small-celled infiltration of substance of medulla ; also thickened blood-vessels. Specimen stained in picrocarmin. Low power.

Fig. 3, portion of the same more highly magnified, showing infiltration of pia and of substance of medulla (*a*) and typical syphilitic endarteritis ; marked thickening of and cellular proliferation in intima (*i*) narrowing of the lumen ; the membrana elastica not visible ; cellular infiltration of adventitia (*b*) also.

Fig. 4, section through dorsal cord (ventral portion), showing leptomeningitis specifica and infiltration of substance of the cord. Low power as above.

Fig. 5, a portion of the same more highly magnified ; very marked thickening of pia ; cellular infiltration seen best in that portion of the pia which projects inward ; infiltration of substance of cord.

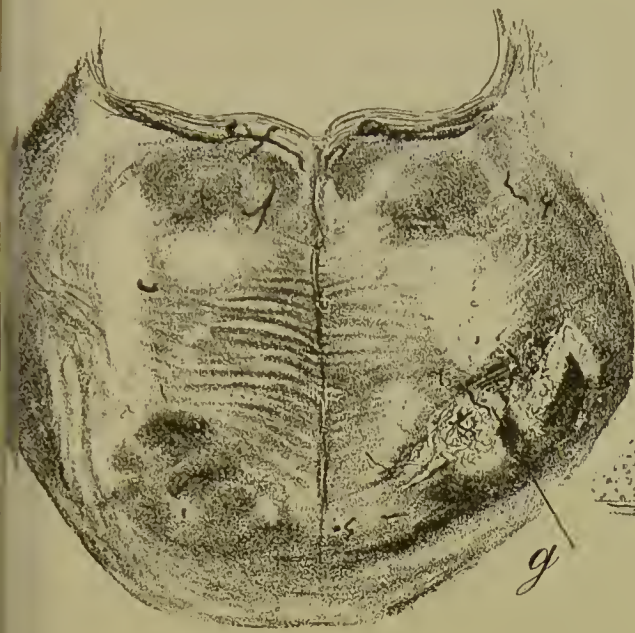


Fig. 1.



Fig. 2.

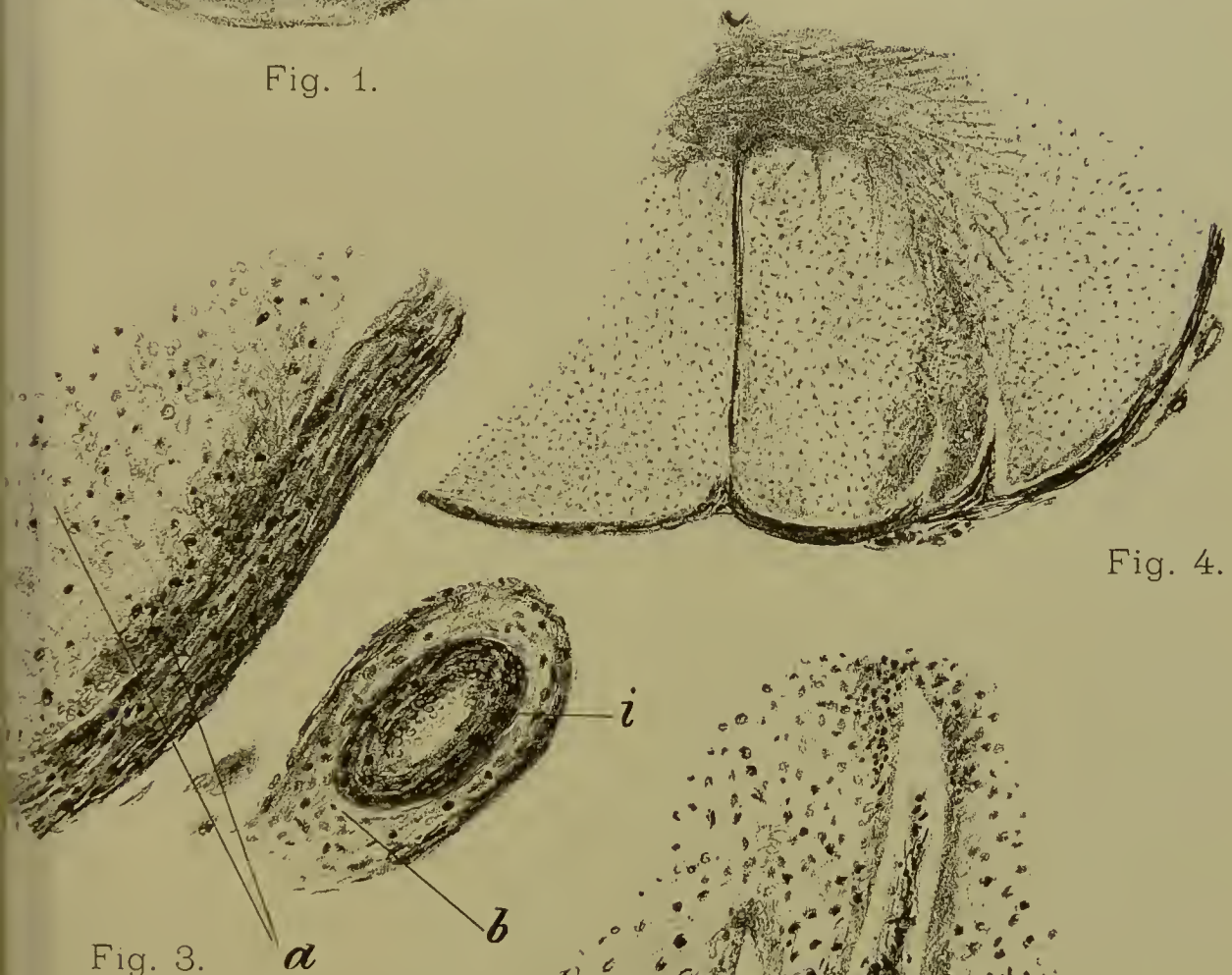


Fig. 3.



Fig. 4.

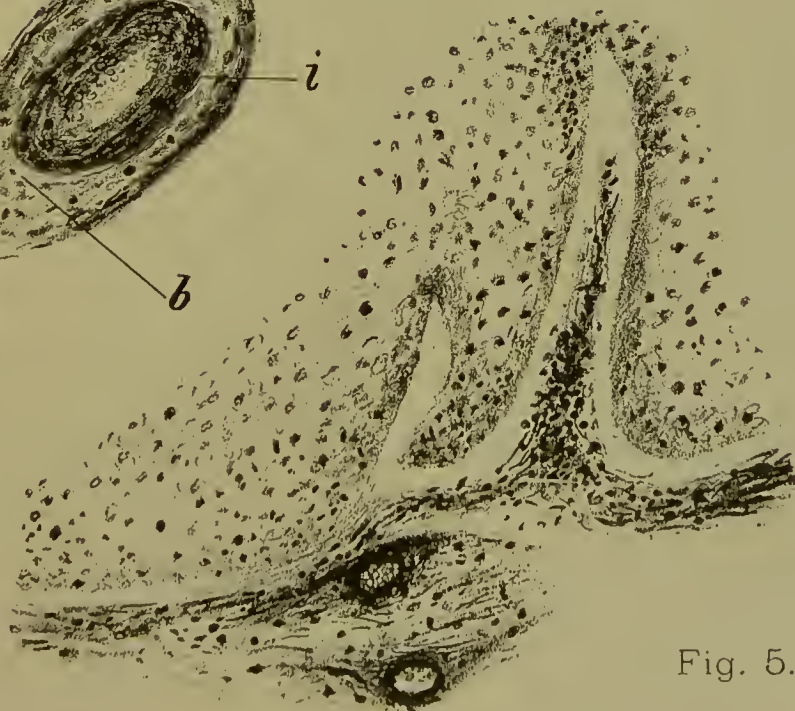


Fig. 5.

HEREDITARY SYPHILIS OF THE NERVOUS SYSTEM.

By WILLIAM N. BULLARD, M.D.

HEREDITARY syphilis of the nervous system may affect any portion of this system, or any portions simultaneously. For purposes of convenience we separate the nervous system into three divisions: 1, the contents of the intracranial cavity (the cerebrum, cerebellum, pons, and medulla, with their membranes); 2, the spinal cord and its membranes; and, 3, the peripheral nerves. Portions of any two or of all three of these divisions may be diseased simultaneously or in succession in the same subject. Moreover, although lesions of the nervous system due to hereditary syphilis may occur without the evidence of the present or former existence of lesions due to the same cause in other portions of the body, nevertheless, in the cases which can *with certainty* be classed under this heading, lesions elsewhere have usually been found. This is due in part to the fact that until lately lesions of the nervous system due to hereditary syphilis could not be recognized by themselves, but only when occurring in conjunction with the recognized symptoms of hereditary syphilis in other organs.

In considering these affections from the clinical standpoint we are at once brought face to face with a serious difficulty. A large proportion of these, due indirectly to this cause, show no certain characteristics by which they can be recognized in the autopsy with the means at present at our disposal. Hence many conditions which are probably due to hereditary syphilis can not be absolutely proved to be thus caused, and we can only premise this probability on account of the frequency of their occurrence in connection with other known symptoms of this affection. Many symptoms thus produced are, moreover, similar to those produced by other causes, and have hitherto been commonly referred to other and more readily recognized diseases or affections, as rachitis, scurvy, and marasmus, especially when they are frequently found in connection with the symptom-complexes known under these names. When symptoms of this character occur without any other definite symptoms of hereditary syphilis, and especially if they do not prove amenable to antisyphilitic treatment, we can not without further evidence than we now possess include these cases as syphilitic, however much we may personally be inclined to con-

sider this the case. Even the proof from antisyphilitic treatment is not conclusive. Other diseases may sometimes be cured or helped by it, and, *per contra*, *very frequently* lesions or affections due to hereditary syphilis can not be cured by such remedies.

Hence, in dealing with affections occurring in or with hereditary syphilis, we are forced to exercise especial care to distinguish between those (a) in which we have pathological proof of their specific origin and (b) those in which no such proof exists. Of the latter class, again, we have two series of symptoms or symptom-complexes: the one, where the symptoms or lesions seem only or most usually to occur in cases where hereditary syphilis exists, and where, therefore, the probability that this is the cause of their existence is very great; the other, where the lesions occur also in other affections, or may be considered as the result of any general weakening of the system, and hence liable to occur with any chronic wasting disease of infancy or childhood, rather than as due to a specific poison. Lastly, there are many symptoms and conditions which occur in the heredo-syphilitic the connection of which with the primary condition is more than doubtful.

In attempting to differentiate between those symptoms which are due directly or indirectly to the specific poison and those symptoms, affections, or conditions which occur frequently in the heredo-syphilitic but are not thus caused, we must therefore use extreme caution, examine all evidence thus far obtained carefully and impartially, and use all means at our disposal to acquire more information. This differentiation is, unfortunately, at the present time not wholly possible. But, so far as we may in this article, we shall make a definite distinction between those symptoms and conditions which can be pathologically proved to be due to hereditary syphilis, whether directly or indirectly; those which seem with considerable probability to be due to this cause, although no pathological evidence in this direction exists; and, lastly, those which seem to be only accidentally coincident with this affection and not connected with it in origin.

Hereditary syphilis of the nervous system manifests itself frequently by a multiplicity of symptoms and lesions; and, although this is not perhaps so important a characteristic as in the acquired form in the adult, it nevertheless dominates many of its forms, and renders the symptom-complex as a whole more varied and complicated than it would otherwise be.

Pathologically we have the same form of lesion in hereditary syphilis that we have in the acquired condition, and, with the exception of the initial lesion we are theoretically supposed to be liable in hereditary syphilis of the nervous system to all or any of the lesions found in acquired syphilis thereof. This supposition may be actually true, but practically we see certain lesions with much greater proportional frequency in heredi-

tary syphilis than in acquired syphilis, and others are much more common in acquired syphilis. The clinical picture is in many ways different in the average case. The percentage of frequency in which given lesions appear in the two forms of syphilis seems distinctly different. This may undoubtedly be due in part to the fact that certain lesions in the hereditary syphilitic do not manifest themselves so plainly, or that they are overlooked. It is probably also due in part to the age of the subject. As hereditary syphilis manifests itself largely in foetal life, or in the early years of infancy and childhood, while the acquired form is on the whole a disease of adult life, the organs and tissues affected are in somewhat different conditions in the two cases. In hereditary syphilis the nervous system is apt to be affected while it is still undeveloped and in the process of development; while in the acquired form it is most frequently attacked after its development has been completed, or even when undergoing the physiological degeneration. For this reason lesions producing or resulting in nondevelopment of the nervous system are largely due to the hereditary form. Syphilis acquired in infancy or childhood may naturally cause such lesions, but this is proportionately much rarer. Yet even these two causes do not seem to account wholly for the difference. As examples, I would refer to the *comparative rarity* of affections of the cranial nerves, with the exception of the optic, and of the symptoms of large cerebral tumors (gummata) in hereditary syphilis.

In order to render as clear as possible this complicated subject, we shall consider first the lesions of hereditary syphilis in relation to their anatomical position, and later the complexes of symptoms as shown in typical cases.

Anatomically we divide the lesions into three classes: I, the cerebral, under which are included all intracranial lesions, except those of the cranial nerves; II, the spinal; and III, the peripheral.

I. CEREBRAL LESIONS OF HEREDITARY SYPHILIS.

As a prelude to the consideration of intracranial lesions in hereditary syphilis, it is necessary to say a few words in regard to the cranium itself, because its condition and affections have so close a relation to the intracranial, both as regards diagnosis, prognosis, and treatment, and because the physician who carefully considers the intracranial structures must also examine carefully all cranial conditions in every case. Fournier has described several varieties or peculiarities found in the crania of heredo-syphilitics. He divides them into those manifesting themselves in the shape of the forehead, and those which appear in other portions of the cranium. Of the first division there are three types:

1. The Olympian forehead, high, broad, and either straight vertically or bulging forward somewhat.

2. The forehead with lateral bosses. These are usually enlargements or hyperostoses of the frontal eminences.

3. The keeled forehead, in which an eminence or hyperostosis occurs in the median line vertically.

Fournier also describes four varieties of cranial peculiarities in other portions of the cranium :

1. Cranial bosses.

2. Broadening of the cranium from the position of the parietal bones, which appear as if pushed apart or outward. Under this heading also he places the natiform skull of Parrot.

3. Asymmetry of the cranium.

4. Hydrocephalic cranium.

To these we may add microcephalus and the rachitic skull.

It will at once be seen that we have in this simply a classification of convenience, setting apart peculiarities of different natures and causations without any reference to their etiology or pathology, or their relation to the primary disease. Some of these conditions appear to be direct results; others indirect results of the constitutional cachexia; and others, again, so indirect or unconnected as to be fairly considered only accompaniments.

To make clear this subject, we must for a moment consider what the results of the direct action of inherited syphilis upon the bones of the cranium really are, and which of the conditions mentioned are thus produced. We can then consider the conditions caused indirectly, and finally those which are only accidental or remote.

The cranial deformities directly due to inherited syphilis are chiefly caused by the various forms of chronic heredo-syphilitic osteitis. Parrot divides these into the atrophic and the osteophytic.

Atrophic Osteitis.—Atrophic syphilitic osteitis of the cranium is always, or nearly always, of the gelatiniform variety. The parts attacked have the appearance and consistence of an “aqueous fruit jelly.” The invasion of the hard parts is marked by rapid decalcification. In the cranium this form, according to Parrot, begins directly under the periosteum, and rarely reaches the dura, although he has seen one case where a localized meningitis was set up at the perforation. The lesion may be circumscribed or diffuse. The affected bones when dried have the appearance of worm-eaten wood or cloth.

Osteophytic Osteitis.—The more common form, however, of osteitis in the heredo-syphilitic is the osteophytic. Hyperostoses, as definite superimposed exostoses or bony elevations, may occur almost anywhere on the external surface of the bones. When in unusual and asymmetrical

positions they have the strongest significance. Exostoses distinctly superimposed are especially common in the situation of the frontal eminences, and this condition accounts for a portion of the cases of Fournier's forehead with lateral bosses. Where such exostosis exists in the median line of the forehead we have Fournier's keel-shaped forehead. Instead of actual superimposed exostoses, it is not uncommon to find in many children the frontal and parietal eminences considerably enlarged and prominent, both more extended and more bulging than normal, but not horn-shaped or pyramidal. The exact cause of these conditions is unknown, but such an appearance can not be considered as proof of inherited syphilis, though it may turn our attention to the possibility of its existence. Some of Fournier's cases of forehead with lateral bosses apparently belong to this class.

Real hyperostoses or bosses are also found frequently at the periphery of the frontal and parietal bones—at the four corners of the anterior fontanelle. They begin as lenticular, red, or violet elevations, usually spongy, sometimes hard and often rough. When thus situated they present a typical appearance, and to them is due the formation of the natiform skull.

The cranial hyperostosis may assume a more diffuse form, affecting nearly all the external cranial bones. It often extends in these cases from one bone to another, causing an early synostosis and bridging or obliteration of sutures. This hypertrophy of portions of the osseous structure of the cranium is not infrequently combined with atrophy or thinning of other portions (Fournier, Parrot, Barlow, Bridges).

The only other direct lesions of the cranium due to congenital syphilis are the gummata, including gummatous infiltration, with their results. These may occur in any position. They are much rarer than the lesions of chronic osteitis.

The lesions of the cranium which may be considered as directly due to hereditary syphilis are (1) the various forms of chronic osteitis, and (2) gummata, necrosis, etc.

It is not intended to imply here that all forms of chronic osteitis in the cranium are due to hereditary syphilis, but only that that disease produces the forms above mentioned. Some of these forms, as hornlike exostoses, the diffuse hyperostoses, and the exostoses of the natiform skull, are characteristic, but some forms are very possibly due to other causes.

The conditions of the cranium found in hereditary syphilis, and which may be considered indirect or secondary, may be classified according as they are the secondary (remoter) results of direct heredo-syphilitic lesions, or as they are still more remote and due either to the general constitutional cachexia, or to other conditions, as rachitis, which are favored by the weakening effect of the syphilis. Both classes

of these conditions from their very nature are not peculiar to inherited syphilis, but are liable to occur under any other conditions where the primary cause exists.

Microcephalus.—By this term we mean not only a small cranium, but a cranium disproportionately small in relation to the rest of the body. The stunted growth, so well known as a symptom of inherited syphilis, naturally affects the growth of the cranium as well as that of other parts of the body, but it is only a part of the general cachexia, is hardly to be considered as a localized symptom, and does not come under this head. The causes of true microcephalus are not fully known. It may in some cases be due to premature ossification of sutures, as is often stated, and might then be caused by a hypertrophic osteitis. Such cases, however, must be rare, and personally we have never seen any where this was proved to be the cause. Where, on the other hand, the microcephalus, as seems to be usually the case, is due to cerebral nondevelopment, if such nondevelopment of the cranial contents be due to inherited syphilis, then the microcephalus may be looked upon as a secondary result of that disease. As, however, it may occur from cerebral nondevelopment arising from other causes, or may possibly be otherwise produced, its existence only suggests more or less remotely the possibility of hereditary syphilis as a cause.

Hydrocephalic Cranium.—The hydrocephalic cranium is due to hydrocephalus. When the hydrocephalus is itself of heredo-specific origin we may consider the form of the cranium a remote result of the syphilis. As, however, the actual frequency of inherited syphilis as a cause of hydrocephalus has not yet been determined, the latter would, in the absence of other signs, not strongly suggest syphilis; but if other signs of congenital syphilis were present, its existence would tend to render the diagnosis more probable.

Asymmetry of the Cranium.—This may depend on many causes. Inferiority in the size of one half of the cranium occurs in company with hemiplegia, the smaller half being sometimes on the side of the paralyzed limbs and then usually forming a portion of a general hemiatrophy, or sometimes on the side opposite the paralyzed limbs. In the latter case it suggests the lack of growth of the cranium over the affected portion of the cerebrum, due to the nondevelopment thereof. Another common form of asymmetry is where one half of the cranium appears to have been pushed forward or backward upon the other. But perhaps even more common is the allied form, in which there exists a simultaneous flattening of the antero-lateral portion of one half of the cranium and of the posterior region of the other half, suggesting strongly the result of pressure exerted on one fronto-temporal and the opposite occipital region at a time when the bones were little resistant. The other forms of asym-

metry, except such as are produced by hyperostoses, growths or atrophies already considered, are rare.

One of the more frequent causes of cranial asymmetry is undoubtedly an undue softness of the cranial bones and a weakness of their union, which permits (1) an excessive mobility of the bones, causing more or less easy displacement at times; and (2) a direct yielding of the bone itself, which takes the form impressed upon it by active pressure or even by the mere weight of the head when lying constantly in a given position. To this cause has been ascribed in many cases the flattening of one side of the occiput, but it can not serve as an explanation when this is accompanied by a flattening of the opposite temporo-frontal region. This general softness of the cranial bones is to be carefully distinguished from a softening thereof. The latter term, properly implying an active process, is said to be not infrequent in inherited syphilis, but whether it be due to the direct action of this disease in any cases seems undetermined. Inasmuch as it undoubtedly occurs in rachitis and is so closely allied to the other symptoms thereof, it would seem wiser for the present to consider this condition rather as a sign of rickets than as immediately and directly due to inherited syphilis. On the whole, asymmetry of the cranium does not in itself strongly suggest hereditary syphilis, except where due to the hyperostoses mentioned above.

Rachitis.—This brings us to the consideration of the accompaniments of hereditary syphilis, and to the much-vexed question of the relation between it and rachitis. Rachitis is undoubtedly more closely connected with it than as a mere accidental concomitant. Rachitic symptoms are very prone to occur in children with a heredo-syphilitic taint, and we are justified in considering that the presence of hereditary syphilis constitutes or furnishes a favorable ground for the existence of rachitis. Whether this is due to the general weakening of the system caused by syphilis, or whether there is a more intimate connection between the two, is yet undetermined. The enormous proportion of rachitic children among those hereditarily syphilitic suggests a more intimate relation than that caused by any chronic cachexia. On the other hand, Parrot's view that rachitis is simply one form of inherited syphilis has not been corroborated. There is no doubt but that at present many cases of rachitis exist in which no evidence of syphilis in the ancestors or in the patient can be shown. In our present state of knowledge this is, however, but negative proof.

For our present purposes rachitis will be considered simply as an accompaniment of inherited syphilis, remembering, however, that it is disproportionately frequent. Of the symptoms of this affection with which we are concerned as regards the cranium, there are three: (1) the diffuse softness of the bones and nonclosure of the sutures and fontanelles; (2)

localized softening of the bones—craniotabes—to be carefully distinguished from the localized softening of direct specific origin; (3) the rachitic form of cranium. All these conditions are well known, and are not subjects for discussion here.

The other accidental accompaniments or concomitants of hereditary syphilis are relatively infrequent, and do not require special mention.

INTRACRANIAL AFFECTIONS IN HEREDITARY SYPHILIS.

Affections within the cranium in hereditary syphilis are apt to be somewhat diffused, and are sometimes multiple, affecting more than one organ or one portion of an organ. This diffusion and multiplicity is perfectly natural, inasmuch as syphilis is a constitutional disease, and its manifestations are not confined to any portion of the body, though more frequent in some than in others. In the beginning, however, it will be easier to consider the different processes in the different tissues separately, always remembering that several of these are likely to occur together or in succession in any given case.

This is not the place to enter fully into the pathological anatomy of intracranial hereditary syphilis, but it will be necessary to say a few words in regard to it for the general understanding of our subject. The pathological conditions found within the cranium in this disease are, roughly speaking, the results of three processes: (1) diffuse syphilitic infiltration; (2) localized syphilitic infiltration or gummata; (3) syphilitic endarteritis of the type described by Heubner. The secondary or remoter accidents within the cranium are the results of these processes. Among these we place hæmorrhages, emboli, thromboses, cerebral softening, sclerosis, and atrophy, as well as the retardation or obstruction of development in the brain. As symptoms of these processes and accidents are produced the convulsions and the cerebral or meningeal paralyses, hemiplegiæ, paraplegiæ, or monoplegiæ so frequent in this affection.

Bearing in mind that the symptoms in hereditary syphilis are primarily dependent on these pathological conditions, we hold the key not only to the pathological conditions occurring in each special part, but to the whole mass of clinical symptoms which seems at first to be so mixed, incongruous, and variable, as to be almost incapable of a rational classification.

Affections of the Meninges are of comparatively frequent occurrence in hereditary intracranial syphilis. Indeed, cases of this disease affecting the intracranial organs in which the meninges are not more or less involved are rather the exception. Many of the cases of involvement of the meninges are secondary to lesions of other parts, but the meninges are, on the other hand, often apparently the primary seat of the trouble.

Affections of the Dura Mater.—Hæmorrhages in the subdural and the subarachnoid cavities sometimes occur in connection with the general hæmorrhagic diathesis which often accompanies hereditary syphilis. Waldeyer and Köbner report a case of hæmorrhagic pachymeningitis secondary to gummatous internal periostitis of both frontal bones. Heubner's case of primary uncomplicated hæmorrhagic pachymeningitis is, up to the present time, almost unique. This case is as follows:

The patient, when a few weeks old, suffered from coryza, and had various eruptions and other symptoms evidently of syphilitic origin. In the eighteenth week symptoms supposed to be those of hydrocephalus, and a rapid increase in the size of the head, occurred. General convulsions occurred at this time. The head continued to increase in size more gradually. The fontanelles were very large and the sutures widely separated. A week or two after the first symptoms of cranial enlargement were noticed the patient made irregular forced movements, twisting of the face and movements of the limbs.

About five weeks after the first symptoms the patient died. The autopsy showed a hæmorrhagic pachymeningitis of the vertex and falx, and to a lesser degree at the base. The brain was normal, and its ventricles were not enlarged.

Apart from the hæmorrhagic form a subacute and chronic pachymeningitis is not uncommon. It is often secondary.

Affections of the Pia Mater, whether primary or secondary in origin, are quite frequent. The acute leptomeningitis of hereditary syphilis so closely resembles tubercular meningitis in its symptoms, that in many cases, without the history or the evidence of lesions in other organs, a differential diagnosis is impossible. Some authors have endeavored to draw reliable distinctions between these two forms of meningitis, stating that in the syphilitic there is little or no fever, and that its course is slower. Our personal experience does not up to the present time enable us to place much value on these distinctions. There is, however, considerable probability that many of the cases which have been reported as tubercular meningitis cured were really of specific origin. I have seen one case which was probably of this character, in which the diagnosis of tubercular meningitis was made and an extremely doubtful prognosis given, but which was followed by a complete recovery.

Chronic forms of leptomeningitis are not rare in hereditary syphilis. They are frequently joined with inflammation of the cortical layers of the brain, and sometimes with that of the dura. How often these forms are primary is doubtful, but it is certain that in acquired syphilis in many cases the symptoms suggest an early involvement, apparently primary, of the meninges. In hereditary syphilis symptoms of this character are much more rare, but we must suppose that in certain cases the infiltration may begin here.

Meningeal hæmorrhage is one of the most frequent and most striking, if not the most frequently noticed of the manifestations of intracranial

hereditary syphilis. It is probably largely dependent on the specific endarteritis, but may undoubtedly be secondary to gummata, and perhaps to other syphilitic conditions. It can not always be distinguished clinically from cerebral hæmorrhage, or from the results of embolism or thrombosis, all of which are often due to the same primary conditions.

Affections of the Brain, including the Cerebrum, Cerebellum, Pons, and Medulla.—The affections of the brain are better considered from the point of their pathological causation than from any other. Many of them are undoubtedly the results of the specific endarteritis, which affects both the large and the smaller intracranial blood-vessels, causing not only roughness and inequality in the lumen, and rigidity, circumscribed or diffuse, of their walls, but also producing dilatations or multiple aneurisms in them. These aneurisms are thin-walled and liable to give way, and many intracranial hæmorrhages are undoubtedly thus caused. On the other hand, the rigidity of the vessel walls, which retards the flow of the blood, and the inequalities and irregularities of the internal surface of the vessels, which offer special opportunities for the deposit of fibrin or the stoppage of any body contained in the blood, serve as specially favorable conditions for thrombosis and embolism. As a result of these processes we have cerebral softening, and all the symptoms and conditions consequent thereon.

What part this *endarteritis* plays in foetal life, and how far it is responsible for cerebral nondevelopment, dating previous to birth, we do not yet know. Nor do we know how far cerebral nondevelopment is dependent on inherited syphilis. The writer freely states that in his opinion cerebral nondevelopment, which antedates birth when not traumatic, is frequently the result of hereditary syphilis; but as yet this is incapable of absolute proof. It is, however, quite certain that a large proportion of the slowly developing nontraumatic conditions which cause impediment or cessation of cerebral development in the infant and young child are either directly or indirectly due to inherited syphilis. Hydrocephalus, in its relation to rachitis, and tuberculosis are, with the exception of certain nontubercular tumors, almost the only other conditions to be considered. The results of specific endarteritis in the brain may be summed up as—1, a gradual diminution in the rapidity of the supply of arterial blood and an inequality in its distribution; 2, thrombosis or embolism, occlusion or partial occlusion of small or large vessels; 3, hæmorrhage, often multiple.

Lesions due to intracranial endarteritis are apt to be multiple, as the endarteritis is itself not localized at a single point.

Other pathological conditions occurring in the brain are diffuse or localized gummatous infiltration. These are on the whole much less common, and rare in acquired syphilis. Gummata of the brain seem to be decidedly rare.

Cortical sclerosis, whether primary or secondary to meningitis, is frequent. Meningo-encephalitis, the result more or less directly of the constitutional disease, is found not rarely at autopsies in hereditary syphilis. Cortical cerebral sclerosis also occurs in hereditary syphilis in another form—slow in its development, and resembling in its clinical aspect the dementia paralytica of the adult. This is still considered among the rarer forms, but it is probably more common than has been supposed. Sclerosis of the whole encephalon also occurs, and Gee has reported some autopsies interesting in this connection.

In addition to the conditions mentioned, and usually accompanying some of them, we not uncommonly find an *ependymitis* which seems to be of specific origin. Sometimes we find ecchymoses, smaller or larger, under the ependyma; in other cases the ependyma is thickened, and suggests chronic ependymitis. The hæmorrhages seem to occur more especially in connection with hæmorrhages elsewhere in the serous membranes, suggesting a general hæmorrhagic condition. Acute or chronic ependymitis may be one cause of hydrocephalus in hereditary syphilis. Few questions have been more discussed than the etiology of hydrocephalus and its relation to congenital syphilis, and even yet this is not by any means decided. It may be much simplified if we consider hydrocephalus to be—as it is—a *condition* or symptom, and not a disease in itself; and as such we shall consider it later, together with other symptoms which are supposed to be diagnostic of hereditary syphilis, or of frequent occurrence in that disease.

Symptomatology.—As would naturally be inferred from the number of pathological conditions, from the variety of their localization, and especially from the frequent multiplicity of the lesions, the symptom-complexes found in intracranial hereditary syphilis are very numerous and varied. In addition, moreover, to those symptoms which we would naturally expect as the direct results, mechanical or otherwise, of the local pathological conditions and of the general constitutional cachexia, we find also those states which, while undoubtedly dependent on morbid changes imperceptible by means of our present instruments, are for purposes of convenience still termed functional, or classed among the mental or psychological conditions.

I shall endeavor, in considering the symptomatology of inherited syphilis, to examine, as far as may be, different types or groups and classes of symptoms, rather than to consider the occurrence of single symptoms separately. Symptom-combinations in this affection are often typical or extremely suggestive; single symptoms rarely or never.

Conditions of the Intellect.—*Mental or psychological affections.* Congenital idiocy, or feeble-mindedness first noticed within a year of birth, is not infrequently the result of hereditary syphilis.

No view entertained, or at least commonly acted upon by a large number of the medical profession, has acted more strongly as a hindrance both to knowledge and to investigation in regard to the condition, prophylaxis, and cure of idiots and the feeble-minded, than the idea that these conditions (idiocy and feeble-mindedness) can be due to anything else than an organic change, whether nondevelopment, atrophy, or destruction of encephalic tissue, visible or invisible with our present available instruments. In the opinion of the writer, all cases of idiocy and feeble-mindedness are due to organic changes in the central nervous system, caused by disease or injury, whether before, during, or after birth. Whether we can perceive these changes macroscopically or microscopically is of little matter as regards their causation. The primary factor in the consideration of these cases is the premise. *Encephalic nondevelopment is invariably due to disease.* Starting with this as the cases of idiocy and feeble-mindedness within the first year of life which are not due to apparent simple nondevelopment are due to gross lesions, we can say at once that *all cases of idiocy and feeble-mindedness are due to disease.* What portion of these cases is due to hereditary syphilis, directly or indirectly, is still uncertain. From a careful investigation of a considerable number of these patients with a view to determining this question so far as possible, the writer is convinced that many of them are the victims of hereditary syphilis.

In the idiots and the feeble-minded of the class before mentioned we find frequently cranial asymmetries and spastic paralyses, whether hemiplegiæ or paraplegiæ. These, when nontraumatic (produced at birth or otherwise), suggest a causation similar to that producing them later in infancy and childhood.

Patients who become feeble-minded more than one year after birth and under ten years of age are apt to become so as the result of an apparently acute intracranial affection. The weakness of intellect in such cases usually results from a severe meningitis or meningo-encephalitis, or as the effect of an apoplectic shock (hæmorrhage, thrombosis, or embolism). Many of these cases of meningitis, meningo-encephalitis, etc., are due to hereditary specific disease, which thus becomes the indirect cause of the feeble-mindedness. When this condition is accompanied by epileptiform convulsions, as is frequently the case, the mental affection seems to be usually due to the primary disease, of which the convulsions are only the expression. We do, however, also find idiopathic epilepsy, hereditary or not, apparently producing weak-mindedness in children, but it usually takes years to bring this about.

In children we also see feeble-mindedness as a result of hydrocephalus, of tumors, and of cerebral sclerosis. These forms are usually slow in development.

Gradual dementia coming on in childhood, without evident cause, is always suggestive of inherited syphilis. Bury relates several cases, with autopsies. The lesions found were chronic pachymeningitis, chronic leptomeningitis, specific endarteritis, and sclerosis of the encephalon.

Summary.—Congenital idiocy and feeble-mindedness occurring or first noticed within one year of birth are not rarely due to hereditary syphilis. These conditions are the results of disease. Feeble-mindedness in children between the ages of one and two frequently appears to be the result of an acute attack, though in many cases this attack is only the first striking manifestation of a chronic process. These attacks are often due to disease caused by hereditary syphilis. Feeble-mindedness in children may also result from hydrocephalus, from acute meningitis, from trauma, and from other causes which have no connection direct or remote with syphilis in any form. It may thus be caused by nonspecific epilepsy or tumors.

Insanity, except dementia in certain cases, can not be regarded as an ordinary result of hereditary syphilis. It may occur in company with this disease in children as an accidental occurrence, or possibly as the secondary result of some specific lesion, but we know of no accurately reported cases in which this has been proved by autopsy. Epileptic insanity is not included in this statement.

Special mental states—dullness, apathy, confusion of mind, irritability, excitability, want of mental control, want of power of concentration, and lack of moral tone—may occur in inherited syphilis as indirect results of the various lesions caused by it. Hysteria is only caused incidentally, and the same is true of Sydenham's chorea. The organic forms of chorea and athetosis are dependent on encephalic lesions, which may or may not be due to syphilis. In regard to *epilepsy* the same holds good. Idiopathic epilepsy (so called) can not be proved to bear any close relation to congenital syphilis. By idiopathic epilepsy is meant such cases as at the autopsy show no evident pathological causation. Clinically there are many cases in which the existence of an organic lesion is doubtful, and many of the pathological conditions caused by hereditary syphilis produce epileptic convulsions. Hence the existence of epilepsy or of severe and repeated epileptiform convulsions in infancy, if no evident cause be found, should always suggest the existence of hereditary syphilis. Even though after repeated examination no evidence of this can be detected, it is often advisable that a thorough specific treatment should be administered.

Hydrocephalus.—There is positive proof that in many cases hydrocephalus coexists with hereditary syphilis. Probably a larger proportion of cases of hydrocephalus occur in company with hereditary syphilis than can be accounted for by the simple doctrine of accidental concomitance.

Of these cases there is a considerable proportion which are evidently secondary to gross lesions, endarteritis, tumors, etc. If these lesions are due to hereditary syphilis, the hydrocephalus may be considered as likewise due to the syphilis. There are also some cases in which the hydrocephalus seems to be due to an ependymitis of specific origin, and there are again other cases in which the direct source or pathological cause of the hydrocephalus occurring in a hereditarily syphilitic child is not apparent. On the whole, a considerable number of cases of hydrocephalus are found which coincide with hereditary syphilis, and in which this may be considered as in some part a factor. On the other hand, by far the larger portion of cases of hydrocephalus are not, so far as can be proved, in any way connected with hereditary syphilis, but rather with rachitis or various other conditions.

Hydrocephalus is, then, one of those symptoms the presence of which, when no apparent cause for its existence appears, may lead us to suspect the presence of hereditary syphilis as a possible factor, but affords no evidence of its existence. If it be present in a case in which other symptoms suggest the presence of hereditary syphilis, it only adds a slight probability in its favor.

Dizziness, vertigo, headache, nausea, and vomiting, are frequent symptoms in all intracranial affections, and they occur in those due to hereditary syphilis in the same way as when the condition is idiopathic or due to other causes. The violent cephalalgias, however, which are so common in acquired syphilis, appear to be less frequent than we might expect, though they do occur, and are said by Fournier to be common. This apparent rarity may be in part due to the difficulty in estimating the amount of pain in young children, but they seem to be actually less frequent and less severe.

Central Paralyzes due to meningeal or encephalic disease are among the most striking and the more frequent symptoms. They are, of course, pathologically secondary to some lesion directly or indirectly due to the constitutional disease. They are frequently the first symptom to call attention to the existence of the trouble. These paralyzes may be temporary or more or less permanent. They may affect all the extremities or any one of them; they may be *hemiplegiæ* or *paraplegiæ*. The face may or may not be affected, but is perhaps less likely to be so than in the hemiplegia of adults. There is nothing distinctive in the character of the paralyzes, but they observe a precisely similar form to the ordinary intracranial central paralyzes due to similar pathological conditions of non-specific origin. In the occurrence, however, of *repeated* cerebral palsies, whether recurrent in the same limb or more particularly when a paralysis occurs suddenly in one or two limbs, to be followed within a few days, weeks, or months by a paralysis of similar central origin in another limb

or limbs, we have a condition strongly suggestive of hereditary syphilis (in the infant or child). Multiple central paralyses of the extremities not occurring simultaneously point strongly to hereditary syphilis as a cause. Recurrent paralyses of the same limb suggest hereditary syphilis as a possible cause, but may be due to tubercular meningitis, or tumors which in children are apt to be tubercular, and are of much less significance in a diagnostic point of view. Recurrent paralyses suggest a localized lesion; multiple paralyses either multiple lesions or a diffused lesion.

The above are the principal symptoms, complexes, and groups of symptoms to be met with in hereditary syphilis affecting the encephalon and its membranes. According to the pathological changes we have the corresponding clinical symptoms, which do not differ from those produced by similar pathological changes due to some other cause. Inasmuch as the clinical effect of typical cases of intracranial hereditary syphilis can be better obtained from the description of single patients than from the broader outlines of symptoms, because the latter are so multiform and varied, we shall give a few cases here, not attempting to afford examples of each symptom-group or of each pathological condition :

I. Female, three years old; patient at Children's Hospital. When one year old the record was made in the Surgical Out-Patient Department, "Probable rickets, though the fontanelle is closed; reflexes increased." When eighteen months old had trouble in the right wrist, and about six months ago a similar trouble in the right foot. The affection seems in each case to have been a swelling, accompanied by some loss of use of the affected limb. Previous to the swelling had an eruption all over, not noticed on palms or soles.

Present condition: Remarkably small for age; face pale, haggard. Circumference of cranium, 44 centimetres; circumference of chest, 46.50 centimetres. The median portion of the cranium along each side of the sagittal suture is raised, forming a plateau or ridge running antero-posteriorly, and suggesting the premature closure of this suture. Upper incisors decayed. Gumma on dorsum of right wrist, and another on dorsum of right foot; right knee can not be fully extended on account of pain and resistance; no evidence of rachitis noted about chest.

This case illustrates one of the conditions of the cranium which are found in heredo-syphilitics. Microcephalus is not very rare, but the sagittal ridge is in my experience somewhat unusual, though I have seen several cases.

II. Female. Mother has had five pregnancies: first, stillborn at six months; second and third, alive, healthy; fourth, stillborn at eight months; fifth, patient.

When a week old had jaundice; later, snuffles; and, when very young, inflammation of the eyes. First seen when nine months old; at that time could not sit up alone or use any of its limbs; lets the tongue hang out of its mouth much of the time; makes a sort of moaning noise much of the time, especially

when nursing; notices objects. Anterior fontanelle very large; no evidence of rachitis; no enlarged glands. When one year old weighed only twelve and a half pounds; chest circumference was 39·50 to 40·50 centimetres; circumference of head, 41·30 centimetres. No special change in strength; makes noises as above, constantly; lower extremities very small, appear wasted.

When twenty-one months old the child had still no strength, and was incapable of sitting up alone or using any of its extremities. It had lost weight, weighing only ten and a half pounds; still nurses, but regurgitates wind "just like a machine"; anterior fontanelle open; body and limbs extremely emaciated; glands, cervical, post-aural, supra-cubicular, and inguinal, enlarged; all the extremities in a condition of spastic rigidity; rugæ on lips; papular eruption about vulva and anus, and on each labium a thick indurated lump, with a portion of its surface ulcerated. Measurements of head and chest as before. This patient was kindly seen by Dr. Abner Post, and the diagnosis of congenital syphilis confirmed. The brother was examined for evidence of specific trouble, but nothing was detected.

III. Female. When first seen, two and a half years old; father addicted to alcohol; appears to have led a very irregular life, and is now separated from his wife, a very respectable woman, and lives in the West. Mother in fair health; no evidence of any constitutional disease. There are six children, all in good health except the patient, who is the youngest. There was one miscarriage between the fourth and fifth child.

Labor not remarkable; child was well and vigorous until six months ago, when she had a sudden attack of general convulsions, with loss of consciousness, lasting from five to ten minutes. About six weeks later she had another attack similar to the previous one in the beginning, with twitching of the lip, but which did not go on to general convulsions, and in which there was no loss of consciousness. With this occurred a paralysis of the left upper extremity, which has remained permanent. Three days later occurred paralysis of both lower extremities. Since these paralysees there have been loss of speech and diminution of intelligence. The patient was treated by the maternal grandfather, a physician in another city, who prescribed iodide of potassium.

Physical examination showed no malformation or abnormality of development. The head was normal in size and shape; there was no evidence of rachitis; no cicatrices; no enlarged glands; heart and other internal organs normal. There was a spastic paralysis of the left upper and of the right lower extremities, very marked in each case. Nothing definite could be detected in regard to the left lower extremity, which had been previously paralyzed, but it afterward appeared probable that a slight degree of weakness existed in this also.

For the next year and a half the patient gradually improved under electricity, developed well, recovered her previous mental powers, and became able to walk, although she was somewhat lame. The upper extremity also improved, though to a lesser degree than the right lower one. At this time she had measles; after which there was for a time more weakness than previously in the right lower extremity, perhaps due in part to the sudden cessation of the treatment for some weeks. This, however, gradually improved, and returned to its previous condition. Six months later, two years after the patient was first seen, she had a sudden attack of weakness of the left lower extremity, without convulsions or loss of consciousness, which improved spontaneously within a week, but did not wholly disappear. Two weeks after this attack she began

to vomit daily, and to appear listless and want to lie in bed. She improved under iodide, but within the next six months had two or three attacks, in which the weakness in the left lower extremity became increased temporarily. She now—two and a half years after first seen—began to lose flesh and strength, and became restless and fretful. Two weeks later she developed the symptoms of an acute meningitis, severe cephalalgia, photophobia, attacks of screaming, with increase of temperature followed by stupor. This illness lasted in the acute stage two weeks, but she eventually recovered, after the attendant physician had given up all hopes, under considerable doses of iodide. She was, however, totally blind, and the specialist by whom her eyes were examined at my request reported (three weeks after acute stage had ceased) that there was beginning optic atrophy, probably following a neuritis. Since then the patient has constantly and steadily improved, and is now, nine months after illness, in good general condition and able to walk well, although totally blind.

I am aware that this case can not be proved to be due to hereditary syphilis, but the evidence in favor of such causation is so strong, that I feel justified in relating it here as a type of a certain class of cases probably due to this disease.

Diagnosis.—The diagnosis of intracranial hereditary syphilis is dependent on several factors. Hitherto it has been made largely from the *history* of the case, the proof or probability of the infection of one or both parents, the occurrence of miscarriages, abortions, or stillbirths in the case of the mother, the occurrence of recognized syphilitic lesions either in the patient or in his brothers or sisters, and from the presence of other lesions due to syphilis at the time of the examination. In other words, up to the present time the diagnosis of inherited syphilis in intracranial disease has been made almost wholly from outside reasons rather than from the character of the disease itself. I think that the time has now come when we are able in many cases to make the diagnosis of hereditary syphilis directly from the intracranial symptoms themselves, while always taking into account any assistance to be obtained from other sources, but no longer absolutely dependent on them. The relative value of symptom-complexes in this regard is very different. The most characteristic form, and one which is strongly suggestive of this affection, is that in which in an infant or young child several attacks of organic paralysis, central in origin, occur at intervals of from days to months without known cause and without marked symptoms of either tumor or tuberculosis. Recurrent attacks in the same limb are less suggestive than attacks in different limbs.

Probably no other single symptom or series of symptoms is so strongly suggestive of inherited intracranial syphilis as this, but there are many others which, when in combination, strengthen and confirm the diagnosis. These have in general been pretty thoroughly discussed under the symptomatology.

There are several symptoms or groups of symptoms which, while not in the least confined to syphilis, should yet turn our attention to it as a possible, if not probable, cause for their existence. The one perhaps most commonly thought of in this relation is epilepsy. Hydrocephalus is another. Meningitis without a cause, especially if not tubercular and not due to otitis, is extremely suspicious. Certain forms of dementia in children are likely to be due to inherited syphilis. Microcephalus, idiocy, and feeble-mindedness suggest syphilis as a possible cause, but probably the large majority of the cases, especially of the two latter, are due to other causes.

As our knowledge is as yet very incomplete as regards the etiology and causation of many of these conditions, and as we have not yet determined how great the influence of inherited syphilis in them really is, the above statements must be regarded as representing only our knowledge or belief at the present moment, and as liable to be modified or changed at any time as further investigations are made and more light shed on this obscure subject.

II. SPINAL LESIONS OF HEREDITARY SYPHILIS.

Diseases of the spinal cord and its membranes in inherited syphilis are rare. Money has reported a case of osteosclerosis of the cranium with thickening of the pia and dura, atrophy and hardening of the cerebral convolutions, and chronic endarteritis of the basal arteries, with thrombus formation in which sclerosis of the pons and spinal cord were also present. The patient was a female, three and a half years old.

Kahler and Pick in 1879, reported a case of sclerosis of the spinal cord in a patient five months old, affected with inherited syphilis. In this case the lateral cerebellar columns were specially affected.

Remak has drawn attention to inherited syphilis as a possible cause of tabes dorsalis; and Rumpf, although he is very doubtful in regard to this, mentions a case of his own in which such a relation seemed possible.

Keyes's case of temporary paraplegia in a heredo-syphilitic may have been due to a variety of causes, but certainly can not have been caused by any organic affection of the cord. The patient, a boy four years old, had complete paraplegia twice, each time lasting one day only. Fournier has reported a case of specific lesion of the spinal vertebræ in a heredo-syphilitic child, in which there was a massive enlargement of several of the dorsal vertebræ forming a prominence. The principal symptom was difficulty in the use of the lower extremities, gradually increasing until

the child was unable to walk, on account of paresis of the lower extremities. The swelling rapidly improved under iodides and the paraplegia grew less. The case could not be followed on account of the patient's leaving Paris.

Laschkewitz, as quoted by Fournier, relates a case of specific hyperostosis of the axis and atlas in a heredo-syphilitic girl of thirteen, which caused symptoms of pressure on the cord, paralysis of all the extremities, and diminution of sensibility. She was cured in two months under specific treatment.

III. LESIONS OF PERIPHERAL NERVES IN HEREDITARY SYPHILIS.

Affections of the peripheral nerves other than the cranial are almost unknown. Remak has, as above mentioned, reported certain cases of tabes in young persons in which the peripheral nerves or their roots were probably affected, but the heredo-syphilitic origin of these is not fully established. Ormerod's case of a fusiform tumor of the median nerve has even less evidence of such an origin in its favor, nor do Henoch's cases, as quoted by Post, seem to us satisfactory. These latter were cases of brachial paralysis, which disappeared under specific treatment. In considering these lesions we are, of course, discussing only heredo-syphilitic affections of the nerves themselves, and not neuritis or other affections secondary to gummata or other syphilitic lesions.

Affections of the cranial nerves, on the other hand, though relatively rare in relation to those in acquired syphilis, are sometimes found. Most of the cases in which these troubles occur are those in which the nerve lesion is secondary either to a meningitis or to a brain tumor or hydrocephalus. Optic neuritis and atrophy are produced in heredo-syphilis by the same conditions by which they are produced in nonsyphilitic intracranial affections. Paralysis of the ocular muscles are sometimes found. In Dowse's case of gummata of the brain there was paralysis of the right sixth and the left seventh nerves, and the left eye was remarkably immobile.

Dr. Barlow reports the case of a boy, fifteen months old, in whom evidences of syphilitic infiltration of the cranial nerves were found. Both third nerves were enlarged at their superficial origin into conical tumors, and there was considerable broadening of the fourth, fifth, sixth, seventh, and eighth pairs. In those examined microscopically there was abundant infiltration of new cells, and almost entire atrophy of the nerve cylinders. Von Graefe has also reported a case of gummatous interstitial neuritis and intracranial perineuritis of the third nerve. Clinically, Maekenzie

has related an interesting case of double ptosis, with recovery. Hutchinson has described a patient of sixteen with bilateral ophthalmoplegia externa.

Hence, direct infiltration and disease of intraeranian nerves may occur. Affections of these nerves secondary to central lesions or meningitis are possibly more common; but affections of these nerves, as a whole, are much rarer in hereditary than in acquired syphilis.

EXPLANATION OF PLATE XXI.

Fig. 1, gummata of the conjunctiva. In the infero-temporal quadrant is a large gumma of the ocular conjunctiva, extending from the lower *cul-de-sac* to the corneal margin, and infiltrating the conjunctiva to such an extent that it overlaps the cornea for some distance. On the temporal margin of the cornea is a small gumma, adjacent to and probably continuous with the large gumma.

Fig. 2, a well-marked example of gumma of the sclera or episcleral tissue on the temporal side of the eyeball; sometimes called scleritis gummosa.

Figs. 3 and 4, double interstitial keratitis, in the last stage of permanent opacity. The acute inflammatory symptoms have all subsided, leaving the deep layers of the cornea occupied by a dense, grayish-white infiltration, the anterior surface being smooth and transparent. (Taken from Jonathan Hutchinson's Treatise on Diseases of the Eye due to Inherited Syphilis, London, 1863.)

Fig. 5, plastic iritis in a syphilitic patient, showing both the conjunctival and ciliary injection, the discoloration and swelling of the iris tissue.

Fig. 6, plastic iritis in a syphilitic patient in the last stage, showing the posterior synechiæ or adhesions between iris and lens, which have not been broken by atropine. The inflammatory symptoms have mainly subsided. (Both these figures [5 and 6] are taken from Juler's Ophthalmic Science and Practice.)

Fig. 7, gumma of the iris, pathognomonic of acquired syphilis. The small yellow nodule on the sphincter margin of the iris in each eye is the gumma. The irides have lost their color and are immovable, and the pupils are irregular in shape, owing to the presence of posterior synechiæ. The deep or ciliary injection is most marked along the superior and inferior margins of the cornea. (By the courtesy of Dr. J. A. Andrews.)



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

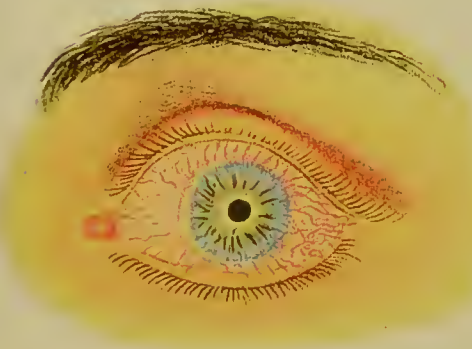


Fig. 5.



Fig. 6.



Fig. 7.

SYPHILIS OF THE EYE AND ITS APPENDAGES.

BY CHARLES STEDMAN BULL, M.D.

I. SYPHILIS OF THE LACHRYMAL APPARATUS.

CONSTITUTIONAL syphilis, as an independent process, rarely attacks the lachrymal apparatus primarily, but usually extends from some neighboring organ and affects the lachrymal apparatus secondarily. The most frequent source of these secondary affections is the nose, in which syphilitic inflammatory and ulcerative processes are so frequently observed and so often involve the nasal duct. Inflammation and ulceration of the nasal mucous membrane extends by contiguity of tissue to the lining of the nasal duct and thence to the lachrymal sac. This in turn gives rise to deeper lesions of the nasal duct, with the group of symptoms so familiar to every one, of purulent discharge from the sac and duct, stricture of the latter, phlegmonous inflammation of the overlying tissues, and the formation of an abscess, ending in a lachrymal fistula. Finally, caries and necrosis of the nasal process of the superior maxilla take place, and usually permanently distort or obliterate the nasal duct. For greater convenience of reference and easier comprehension, syphilitic diseases of the lachrymal apparatus will be considered under three heads: Lesions of the Lachrymal Gland, Lesions of the Lachrymal Caruncles, and Lesions of the Lachrymal Passages, including Canaliculi, Sac, and Nasal Duct.

I. LESIONS OF THE LACHRYMAL GLAND.

It may be doubted whether syphilis ever affects the lachrymal gland *primarily*, for but few such cases have been reported, and even these are incomplete and unsatisfactory. It is here necessary to bear in mind the importance of distinguishing between two varieties of syphilitic lesions, viz., between those lesions which are met with directly or primarily in the organ in question, and those which occur indirectly or secondarily in the organ as a consequence of lesions in the neighboring parts. Several of the older writers speak in a general way of chronic inflammation of the lachrymal gland—dacryoadenitis—as sometimes due to syphilis, and among these may be mentioned Chálons, Tavignot, Streatfield, Adler, Aldini, and Alexander, all of whom have reported cases of tumors of the

lacrimal gland, which, from their symptoms and course, pointed to syphilis as the cause. Alexander's is the latest and most probable case, but even here the gummatous infiltration of the gland may have extended to it from the surrounding connective tissue. The symptoms of a gummatous infiltration of the lacrimal gland would be the presence of a tumor in the upper and outer angle of the orbit, which extends backward into the depth of the orbit and forward beneath the conjunctiva of the upper *cul-de-sac* and upper lid, causing an appearance of ptosis. If the tumor were of considerable size, the eyeball would be displaced downward and inward toward the nose. The tumor would be sensitive to pressure, and if other symptoms of constitutional syphilis were present, the diagnosis of gumma of the lacrimal gland would be made.

It might be conceived that, owing to its situation, the lacrimal gland might become inflamed as a consequence of periostitis of the orbit. The inflammatory process might extend from the periosteum to the fibrous envelope of the lacrimal gland, and thence to the trabeculæ in the interior of the gland. The writer has seen several such cases, in all of which the gland was enlarged and inflamed as a consequence of general inflammation and infiltration of the orbital tissues, spreading from a diffuse orbital periostitis. There was excessive exophthalmos and severe pain. In one of these cases the entire contents of the orbit, including the eye, already partially blind from irido-choroiditis, were removed to relieve the excessive pain. The lacrimal gland was found generally enlarged, the hypertrophy being due partly to increase in the connective-tissue elements of the gland and partly to gummatous infiltration. The patient subsequently died from meningitis and gumma of the dura mater. Unless periostitis be present, there is usually no pain in these cases, except on pressure.

II. LESIONS OF THE LACRYMAL CARUNCLE.

The caruncle may be affected by syphilis secondarily, as in the extension of a simple conjunctivitis, or of a conjunctival ulceration from a broken-down papule or tubercle. The caruncle may also become inflamed as a consequence of inflammation of the lacrimal sac, and would probably become involved in cases of caries or necrosis of the lacrimal bone. The first change would be a hypertrophy, which would probably be followed by atrophy, and -perhaps by entire disappearance of the caruncle. Gummatous infiltration of the caruncle has been described by Dr. R. W. Taylor, of New York, who has reported two cases. In both cases a swelling appeared at the inner angle of each eye, which proved on examination to be the caruncle enormously enlarged, deep red in color, firm to the touch, and protruding markedly between the edges of the closed lids. In one case these tumors were removed by operation by a

surgeon, which was followed by decided deformity. In the other case persistent antisyphilitic treatment caused a reduction of the growth, and eventually atrophy of the caruncle.

III. LESIONS OF THE LACHRYMAL PASSAGES, INCLUDING CANALICULI, SAC, AND NASAL DUCT.

When we come to consider the lachrymal excretory passages, we find that syphilitic lesions are not at all uncommon, especially in the lachrymal sac and nasal duct. These lesions are manifestations both of early and late constitutional syphilis, and are usually accompanied by some other general symptoms.

Beginning with the canaliculi, including the puncta, we find that the form of conjunctivitis so often seen with syphilitic iritis may spread to the tear channels in the lids through the puncta, and soon causes a narrowing or obliteration of the caliber of the canal or punctum, and prevents the drainage of the tears. As a result there is constant epiphora, which keeps the edges of the lids and the external surface of the lower lid constantly irritated. This same inflammation may extend through the canaliculi to the sac and cause a dacryocystitis, though usually inflammation of the sac originates in trouble in the nasal duct, which has spread from the nose. Another lesion of the conjunctiva, or edge of the lid, which may involve the punctum and canaliculus, is a chancre occurring in this locality, which may obliterate the punctum and canal by ulcerative action. Another conjunctival lesion which may involve the canaliculus is a papular or tubercular syphilide, which generally begins on the margin of the lid in this vicinity. These syphilides often break down, ulcerate, and prove destructive to one or both canaliculi.

Inflammation of the conjunctiva and canaliculi may extend to the lachrymal sac and excite a dacryocystitis, which is at first catarrhal, but subsequently becomes purulent. But the course of the disease is usually in the reverse direction from the nose, through the nasal duct into the sac. Moreover, purulent dacryocystitis is not common unless there is present disease of the periosteum of the nasal duct, or caries of the bony canal or lachrymal bone. In some cases the focus of disease may start in a periostitis of the nasal duct, independently of any disease in the nose, as a result of constitutional syphilis, and thence spread to the mucous membrane lining the duct and sac, thus causing the dacryocystitis. This periostitis usually tends to caries of the underlying bone if not promptly treated; but it may be sluggish and chronic in its course, and may be accompanied by the development of a subperiosteal gumma, which would entirely obliterate the caliber of the duct. The occurrence of these gummata in the wall of the nasal duct is not very uncommon. Another source of obstruction in the duct, which acts as an indirect cause of inflammation of the duct

and sac, is the occurrence of a mucous patch on the wall of the nose at the mouth of the duct, which closes the orifice.

The obstruction to the course of the tears in their downward flow may occur at any point in the length of the duct, and in syphilitic patients is usually met with at or near the mouth of the duct. It is, however, by no means confined to this spot, but spreads upward toward the sac, so that the stricture may in time nearly equal the duct in length. This stricture, when membranous in character, may remain so to the end, and is amenable to treatment; but if the periosteal lining of the duct be involved in the process, or the bony wall be diseased, the treatment becomes very chronic. In some instances the duct becomes obliterated. Usually, before this stage has been reached, the lachrymal sac has become inflamed, the dacryocystitis has developed into an abscess and opened externally by a fistula just beneath the internal canthal ligament.

Symptomatology of Dacryocystitis and Stricture of the Nasal Duct.—There is first an overflow of tears, more or less marked; then a sense of distention in the neighborhood of the lachrymal sac, followed by a distinct swelling in this region. Pressure with the finger at this point causes an evacuation of glairy mucus or muco-pus through the puncta into the conjunctival *cul-de-sac*. This condition may remain unchanged for an indefinite period, or the inflammation in the sac may become distinctly purulent. Then the overlying connective tissue becomes infiltrated and brawny, the skin becomes adherent, and finally all the tissues ulcerate, the abscess opens externally, and a fistula of the lachrymal sac is the result. This, however, is not common, unless caries be present. The longer the chronic stage lasts in the duct or sac the greater is the probability of the bones becoming diseased. Though ordinarily occurring as a late manifestation of syphilis, the lesions in the nasal duct may be precocious.

Mucous patches are much less frequent in the nose than in the mouth or pharynx, and are usually confined to the inner surface of the alæ of the nose, to the septum nasi, or to the anterior ends of the inferior turbinated bones. They are almost always erosive in their nature, and in the nasal duct they produce more or less destructive inflammation of the periosteum, and extensive caries of the bony walls. The syphilitic disease here attacks the bone in two ways: First, there may be congestion, rapidly followed by a molecular destruction of the bone tissue, or osteitis and caries; this process soon destroys the lachrymal bone and upper end of the nasal process of the superior maxilla. The second process is a pure necrosis, in which the bone becomes more profoundly diseased, and distinct sequestra of varying size are detached, which require operative interference for their removal. This form of bone lesion may be a primary one in the upper jaw, and is the cause of those cases of total oblit-

eration of the nasal duct which are sometimes met with, by the falling together or caving in of its walls, and subsequent adhesion of the bony surfaces by inflammatory action. Another form of lesion which occurs in the nasal duct is an osteo-periostitis gummosa of very rapid development, ending in suppuration. The obstruction of the duct by these gum-mous growths, developed in its walls, would be very rapid, owing to the incompressibility of its walls and the small size of its caliber.

Another form of syphilitic lesion of the lachrymal passages which is rare, may be described as a hyperplastic process in the bones, which aid in forming these passages, or exostoses and periostoses of the lachrymal bone, and of the bony wall of the nasal duct. These bony outgrowths do not always occur solely in the nasal duct, for they have been met with in the angular apophysis of the frontal bone and in the lachrymal bone. These exostoses ulcerate and become carious, or the bony walls of the duct approach each other, the lining fibro-mucous membrane becomes inflamed, ulcerates, and is destroyed, and in this condition the case is irremediable.

Hyperostosis is a very different process, is never ulcerative in its action, and causes an obliteration of the caliber of the duct, simply by the enormous hyperplasia of bone tissue in the superior maxilla. As a disease process it is not susceptible of treatment.

Treatment.—This varies somewhat, according to the stage of constitutional infection and the severity of the lesion. If the latter be a simple inflammation of the lining of the canaliculi or sac, which has spread from a conjunctivitis which is so commonly associated with syphilitic iritis, nothing is required but a simple, mild astringent lotion locally, and the cautious administration of mercury in some form, externally, internally, or both.

If the inflammatory action is more severe, with secretion of mucus or pus, with a swelling over the seat of the lachrymal sac, and if there is good reason for suspecting a stricture of the duct, do not resort to operative interference until internal medication has been tried faithfully. The use of mercury must here be more prompt and its effect must be more rapidly produced, or the disease may extend from the lining of the canal to the bony walls. If pushed rapidly to toleration limits, a beneficial effect upon the lesion will be observed on the third or fourth day, and then the mercury may be either entirely discontinued, or given in smaller doses at longer intervals. At the same time the application of hot bichloride solutions to the parts involved, and frequent instillations of the same, in the strength of 1 to 5,000, into the conjunctival *cul-de-sac*, are to be persisted in. In many of these cases complete recovery follows such a course of treatment, and the patency of the duct is restored without any incision or probing.

If the case is chronic, and there is reason to suspect the presence of caries of the bony wall of the duct or of the lachrymal bone, the main reliance is to be placed on potassium iodide, which should be given at first in moderate doses and gradually increased up to the limits of toleration ; being guided in our action by the severity of the case and the idiosyncrasy of the patient. Even in cases of long standing, with perhaps a fistula of the lachrymal sac and extensive disease of the bones, this treatment, if rationally begun and patiently persevered in, will in many instances effect a cure without the aid of knife or probe. Usually, however, in long-standing fistulæ, the edges of the external opening become indurated and somewhat everted, and in such cases the edges must be freshened and pared, and brought together with one or two sutures, before adhesion of the external lips of the opening occurs.

In some very protracted or virulent cases no treatment, internal or operative, will bring about a good result. These cases are examples of extensive destruction of bone, in which the caliber of the canal has become entirely obliterated by adhesions of the walls of the duct from destructive inflammation and subsequent atrophy of the bone after caries. This usually occurs in the lower third of the canal, but sometimes it is met with near the point of union of sac and duct. The best that can be expected in these cases is to allay the purulent inflammation in the lachrymal sac by slitting up both canaliculi and washing out the sac with astringent and antiseptic solutions. If, in spite of this treatment, the suppurative process still continues and the caries in the lachrymal bone is not extensive, it is better to destroy the sac by the application of nitric acid on a cotton holder, or by the galvano-cautery. If a lachrymal fistula is present, the latter is to be laid open to the sac, the sac must be freely incised, and the cautery applied thoroughly to its entire inner surface. If there is no fistula, the sac may be opened from the side toward the earuncle, inside the internal canthus, by connecting the incised canaliculi by a long vertical incision, and the cautery applied thoroughly to the sac and inner surface of the canaliculi. Free suppuration ensues, and the cavity generally closes in about three weeks. Epiphora remains for some time, but eventually diminishes and may entirely disappear, possibly from compensatory atrophy of the lachrymal gland. If the caries is extensive, all the dead pieces of bone must be carefully and thoroughly removed, and the sac dissected out and removed entire. Free irrigation of the deep cavity thus left, with antiseptic solutions, must then be instituted, and the hole allowed to granulate from the bottom.

II. SYPHILIS OF THE EYELIDS.

In the eyelids we meet with four varieties of syphilitic lesions, viz. : 1, the chancre or initial lesion ; 2, papules or tubercles, the so-called tubercular syphilides ; 3, rupial ulcerations ; 4, gummata. They are all generally met with in the lower lid, along the edge of the lid, and at both canthi. They are rare manifestations of constitutional syphilis.

Chancre.—The initial lesion may occur on the edge of the lid, involving both skin and conjunctiva, or on its inner conjunctival surface, or on its outer skin surface. It presents all the signs of a chancre anywhere else in the body. The original starting point has never been definitely determined, but it is probably caused by inoculation of the virus in the mouths of the excretory ducts of the Meibomian glands. The ulcer then opens out on the lid margin, or on the tarsal conjunctiva near the edge of the lid. It begins usually as a slight swelling or tumor like a pimple, painless, but producing much itching and irritation. The summit next becomes excoriated, the ulcer growing broader and deeper, and soon taking on the characteristic form. The ulcer is rarely deep, but rather saucer-shaped. The edges are not steep or punched out, but are sloping or rounded, slightly raised and irregular or eroded, and the edges are firmly indurated. The floor is moist, and covered with a grayish or dirty-yellow *débris*. The base is very distinctly indurated, and often extends for some distance beyond the area of ulceration. The ulcer may spread widely and become very irregular. The conjunctiva is more or less congested, and there is some mucopurulent discharge. In some cases the lid becomes enormously swollen and tense. If the chancre is at the inner canthus, where it may involve the punctum or canaliculus, the epiphora or watery condition of the eye is marked. Pain is rarely met with. Induration of the neighboring glands is an almost constant symptom, though it may make its appearance very late in the course of the disease.

Etiology.—The two principal modes of contagion are the unclean fingers and the diseased mouth, lips, and tongue. Virus may be conveyed by the patient's own fingers from the genitals of the syphilitic person. The act of kissing is a frequent source of contagion, the virus coming from mucous patches on the lips and tongue.

Diagnosis.—The resemblance of a chancre to a broken-down or ulcerated tertiary syphilide is often misleading. A tertiary ulcer or a broken-down gumma, however, has not the characteristic induration, though it has an infiltrated base. Its edges are sharply cut or punched out, its floor is bathed in pus, and the neighboring glands are rarely indurated. It might be mistaken for a hordeolum or sty, but the latter has an acute course, is painful, its base, though swollen and inflamed, is

not indurated, and it heals rapidly after being opened. A chancre might also be mistaken for a suppurating chalazion, but the latter has a narrow, deep opening, with soft edges and no induration. When situated at or near the inner canthus, a chancre has been mistaken for an ulcerated lachrymal abscess, but here the history should enable us to distinguish between them. Rodent ulcer and epithelioma, occurring on the margin of the lid, have some points of resemblance to a chancre, but they occur, as a rule, late in life, and are very chronic in their course. Moreover, the floor of such an ulceration is red and granular, and the ulcer tends to spread, healing as it extends. A chancre may also be confounded with lupus, but the latter is rarely confined to this site, and may be discovered elsewhere on the cutaneous and mucous surfaces.

Course.—A chancre of the lid is somewhat chronic and indolent, remaining inactive for several weeks. It is not very responsive to treatment, and sometimes under injudicious treatment it actually increases in size. After several weeks the ulcer undergoes cicatrization. The induration is very persistent, and may remain for months as a cartilaginous nodule, after the ulcer has healed. The prognosis is favorable, so far as the eyeball is concerned. It rarely leads to any serious loss of substance or distortion of the lid. Local treatment is of little or no avail.

Syphilitic Eruptions.—The exanthematous lesions of the lids are usually of the papular or tubercular variety. A syphilitic eruption very rarely occurs on the conjunctival surface, but it is quite common on the skin surface. The result may be an ulcer, the center of a papule or tubercle breaking down and sloughing. They may occur at any age, and at almost any period of the constitutional infection. They may be confined to the skin, or may involve the entire thickness of the lid. They may extend superficially along the edge of the lid or into the tissues of the lid. Syphilitic papules may be of rapid growth and great size, but they do not extend deeply, and the destructive process is consequently superficial. A tubercular syphilide is, however, more distinctive in its action, and the general infiltration may be so marked that we have practically to deal with a diffuse gumma. It presents the same characteristics as a gumma, and microscopically the two are one. They have no particular shape or arrangement, and they are not symmetrical. The resulting ulcer is generally a deep, punched-out cavity, with uneven edges, irregularly crescentic in shape, and covered with a reddish-gray deposit or a brown crust. Their original site is either in the corium or in the subcutaneous cellular tissue, and they are usually painful on pressure. They may produce deep destruction, contraction, and distortion of the lids. They may disappear by absorption, or they may disintegrate by retrograde metamorphosis. In the latter case the cuticle becomes thinned, ruptures, and an ulcer is formed, which sometimes extends slowly, some-

times rapidly, its edges become undermined, the surrounding areola widens and becomes very dense and of a dusky red hue, and the base is foul, grayish-red, and covered by a discharge. When healing begins, the ulcer assumes a healthier appearance, the areola becomes softer, and finally a cicatrix is formed with a central depression and peripheral pigmentation. The ulcerated tubercular syphilide must be distinguished from lupus and epithelioma. It is not likely to be mistaken for lupus erythematosus, for the latter extends slowly and never suppurates or ulcerates. In lupus vulgaris the nodules are softer and of slow growth. Lupus generally heals with a diffuse white scar. From epithelioma it must be distinguished mainly by the results of constitutional treatment. In the nodular stage, before ulceration has occurred, a tubercular syphilide might be mistaken for acne indurata, and here the history and coexistent symptoms must help us to a decision.

Gummata of the eyelids, when confined to the skin or edge of the lids, are not uncommon. They are characterized by a dense, board-like hardness of a part of the edge of the lid, and the skin of the lid is of a dark-red or reddish-brown color. When nodular in shape and isolated, they are one and the same with a tubercular syphilide. It is only when the infiltration is diffuse that it is necessary to distinguish between them. Here the whole lid is swollen, particularly along the ciliary margin. If it is the upper lid which is involved, the ptosis is more or less complete. The process may be either acute or chronic, and usually other symptoms of syphilis are present, such as glandular enlargements, periosteal inflammation, and nodular growths.

Tarsitis Syphilitica, or gummatus infiltration of the tarsus, is a rare disease, which has been described by Michel, Magawly, C. S. Bull, and others. It is a chronic, indolent infiltration of the tarsus, which does not involve the external skin. This process of infiltration is not, however, always indolent or passive. It is usually accompanied by some little œdema of the conjunctiva and swelling of the rest of the lid. It is almost always in the upper lid, and generally involves the entire lid from inner to outer canthus, though it may be circumscribed. After its disappearance the tarsus is found to have entirely lost its normal resistance. There is no pain, and no secretion from the conjunctiva, and the disease is of slow progress. The tumor is hard, resisting, and solid. The lid can not be everted. The swelling is homogeneous throughout, and, though starting in the tarsus, generally involves the other tissues of the lid, with the exception of the skin and perhaps also the conjunctiva. After the dense infiltration has somewhat subsided under appropriate treatment, so that the lid may be everted, there may be seen in various places under the conjunctiva a brawny, yellowish-white infiltration of the tissues, which slowly subsides. The cure is probably never a com-

plete one; for, after the absorption of so extensive and dense an infiltration, more or less deformity of the tarsus must and does result, from compression or softening of the tarsal tissue.

III. SYPHILIS OF THE CONJUNCTIVA.

Syphilitic lesions of the conjunctiva, existing independently, and not connected with lesions of the eyelids on the one hand or of the eyeball on the other, are not common. The connection between the palpebral conjunctiva and the other structures of the eyelids is so intricate that syphilitic infiltration of the lid, be it circumscribed or diffuse, soon involves the mucous membrane also. The same may be said, in a modified sense, of the connective tissue between the ocular conjunctiva and the underlying fibrous capsule of the eyeball.

Conjunctivitis.—In syphilitic patients we not infrequently meet with an obstinate conjunctival inflammation of the catarrhal type, but with little or no secretion, and yet there is no positive evidence that the conjunctivitis is caused by syphilis. This is especially noticeable in cases of obstinate iritis.

As a matter of clinical experience, it may be stated that the syphilitic lesions of the conjunctiva are of three varieties, viz.: 1. Eruptions or exanthemata. 2. Ulcerations. 3. Infiltrations. Under the head of ulcerations are to be considered the chancre or initial lesion, and secondary ulcers resulting from the disintegration and breaking down of infiltrated masses. All modern authorities agree in recognizing the occurrence of the initial lesion upon the conjunctiva, as well as gummatous infiltrations and secondary ulcerations.

Chancre.—The initial lesion is rarely met with on the eyelids, and is a still more rare occurrence on the conjunctival surface alone. In most of the reported cases the ulcer has been on the margin of the lids, where cutaneous and mucous surfaces meet. But the author of this chapter has published a case of chancre which was confined to the conjunctiva and pursued an unusual course, and the history of this case is as follows: The patient was a young man, aged twenty-nine, who had never had any other symptom of venereal disease. The mode of origin of the ulcer was unknown, as there was no history of any contamination. The lower lid became somewhat inflamed, swollen, and painful about a week before he presented himself for treatment, and there was a slight muco-purulent discharge. On everting the lower lid, deep in the *cul-de-sac*, about a quarter of an inch from the external canthus, was an ulcerated surface covered by a grayish, pulsatous matter, with hard base, the induration extending for some distance on every side. The ulcer was an irregular

oval, half an inch across in its longest diameter, and extended upward into the ocular conjunctiva, which was very much thickened. The whole conjunctiva, both ocular and palpebral, was intensely congested. The pre-auricular gland of the corresponding side was enlarged and tender, and later the same symptoms appeared in the parotid and submaxillary glands. The ulcer was cauterized, and the patient was at once placed on antisyphilitic treatment. The sore healed in about three weeks, and the engorgement of the glands gradually subsided. Nine weeks after the appearance of the ulcer an eruption, roseolar in character, appeared on the face and hands and soon became general. Some weeks later several mucous patches appeared on the buccal mucous membrane and side of the tongue. The patient subsequently suffered from iritis in one eye.

There seems little doubt that either the ciliary margin of the lids, or the *cul-de-sac* between lids and eyeball, are the parts most frequently affected by the chancre. There are some rare cases reported where the lesion was in the ocular conjunctiva at the edge of the cornea, but the diagnosis needs confirmation, and they may have been ulcerated gummatous deposits, or even nonspecific ulcers.

Secondary Lesions.—These lesions, occurring during the period of constitutional infection, are much more frequent than the initial lesion. They may be of the nature of eruptions, appearing as small, circumscribed, elevated, nonvascular spots, of a reddish-gray or coppery color, not differing much from certain eruptions on the skin, with which they may coexist. These *papules* or *pustules* may appear singly, in which case they are apt to be of some size; or there may be several of them, which occasionally show a tendency to coalesce. Where they are multiple they are of small size.

Mucous Patches on the conjunctiva resemble absolutely the mucous patches met with in the mouth or on the lips. They may ulcerate, and then appear as shallow, irregular sores or ulcers, with a tawny surface and ill-defined base. They usually respond readily to treatment.

Ulcers.—Though ulcerations of the conjunctiva generally occur with other syphilitic ulcerations on different parts of the body, yet they usually result from the disintegration of gummatous infiltrations, and not from mucous patches. In isolated cases the process begins with infiltration of a portion of the conjunctiva, which may be distinctly circumscribed or more or less diffuse, but quickly ulcerates, and is easily distinguished from the surrounding tissue by its fatty-looking coating, irregularly eroded edges, and uneven base. If properly treated, these ulcers generally cicatrize rapidly, and if they are situated on the edge of the lid they appear as a tendinous white cord, which extends through the entire thickness of the edge of the lid, and, in consequence of its great shrinkage, eventually forms an excavation in the lid. The isolated occurrence

of these superficial ulcers of the conjunctiva is symptomatic of constitutional syphilis.

Gummata.—True *gumma* of the *conjunctiva* is probably the least common of all syphilitic lesions. It is certainly a rare and always a late lesion of constitutional syphilis. It may be either circumscribed or diffuse. Late manifestations of syphilis are rarely limited to the conjunctiva, but usually begin in other tissues and involve the mucous membrane by contiguity of structure. A gumma sometimes appears as a small, discrete tumor in the conjunctiva, varying in size from a pea to a bean, semiglobular in shape, with white or yellowish summit and red base. Under the microscope such a growth is found to consist of a mass of young cells lying in a granular matrix. These gummata sometimes disintegrate and ulcerate rapidly, and are then accompanied by a slight diffuse oedema of the conjunctiva. They are usually met with in the palpebral conjunctiva, or in the *cul-de-sac*, but a few cases have been reported where they appeared in the ocular conjunctiva, immediately around the cornea (Plate XXI, Fig. 1). They are here moderately hard to the touch, and are but slightly vascularized. This is a more dangerous location for them than in the *cul-de-sac*, for if several appear in this locality they may coalesce and form a zone of dense infiltration around the margin of the cornea, interfere with its nutrition by pressure on the lymphatics, and thus lead to necrosis of the cornea and destruction of vision.

IV. SYPHILIS OF THE CORNEA.

Until a comparatively recent period it was not generally believed that acquired syphilis ever affected the cornea. But it is now admitted by many authorities that, in the late periods of constitutional syphilis, lesions may appear in the cornea, which only yield to energetic antisyphilitic treatment; and these corneal lesions may perhaps be classified in the following way: 1. Diffuse parenchymatous or interstitial keratitis, which may involve either the center or the periphery of the cornea, or may assume a triangular shape, and which is always accompanied by malignant iritis. 2. The true keratitis punctata of Mauthner, or the keratitis interstitiales punctiformis specifica of Hock, in which numerous punctate spots of infiltration appear in the parenchyma of an otherwise transparent cornea, without iritis. 3. Keratitis punctata, in which the punctate deposits are accompanied by a generally cloudy cornea, and by iritis. 4. Gummatus degeneration of the cornea.

Alexander claims to have met with corneal lesions in 5.48 per cent of syphilitic diseases of the eye which he has observed.

Interstitial Keratitis.—The best known and most frequently met with lesion is the *diffuse parenchymatous* or *interstitial keratitis*, which

is far more frequently the result of inherited than of acquired syphilis. The *acquired form* is characterized by a cloudy opacity situated in the deeper layers of the cornea, which does not present a general homogeneous, gray appearance, but rather consists of a number of irregularly outlined gray or yellowish-gray spots of varying intensity, more or less closely connected together, which are more readily recognized by oblique illumination than by ordinary illumination. The opacity usually first appears at the center of the cornea and extends thence toward the periphery, obscuring the iris. More rarely, it begins at the margin and extends toward the center. The anterior epithelial layer and Bowman's membrane appear stippled, while the membrane of Descemet appears unchanged. In this cloudy parenchyma vessels may be seen to enter at different depths, sometimes few, sometimes many in number; sometimes confined to the marginal zone, sometimes extending to the center. The deep ciliary injection, on the other hand, is generally absent or but little developed. The usual subjective symptoms of corneal inflammation, such as photophobia and lachrymation, are but slightly marked, unless the iris becomes involved. Leber, Jakolewna, Mauthner, and others have all seen and described it, usually in connection with some other syphilitic ocular lesion, and Alexander has reported thirteen cases. The process is always slow, lasting not only weeks, but months, and even years, but without any very unfavorable prognosis. It never ulcerates, though it may produce a permanent alteration in the corneal curvature.

The *second* variety of diffuse syphilitic keratitis is characterized by the opacity beginning at the periphery and extending toward the center, giving to the cornea the appearance of ground glass. The line of demarcation between the infiltration and the clear cornea is rounded and diffuse. The epithelium is intact and brilliant, and there are no vessels visible. Hock, Demarbaix, and Sturgis have also described similar cases, always in combination with iritis.

Keratitis Punctata.—Another variety of syphilitic parenchymatous keratitis is the true keratitis punctata, as described by Mauthner and Hock, characterized by the deposit of circumscribed gray spots, as large as a pin's head, in the corneal parenchyma. There are no blood-vessels visible, and the intervening corneal tissue is transparent and apparently normal. These spots may appear rapidly and as rapidly disappear, and they never suppurate or ulcerate. The iris seems never to be involved in the inflammatory process.

This appearance is entirely distinct from the old disease, formerly incorrectly called "keratitis punctata," which consists of punctate deposits on the endothelium of the cornea, the product of serous iritis. All these varieties of parenchymatous keratitis belong to the late period of constitutional syphilis. They are all very chronic, but yield to persistent

treatment, and end by disappearing gradually and entirely. In addition to the general constitutional treatment, the local treatment consists in the application of hot fomentations for fifteen or twenty minutes on the closed lids every few hours, the instillation of a solution of atropia, and leeches to the temple if there is much pain.

Gummatous Infiltration.—A fourth form of syphilitic lesion of the cornea is a gummatous infiltration, beginning at the periphery and extending a varying distance into the parenchyma, and resembling a syphilitic tubercle. Denarié, Watson, and Magni have all reported cases of this nature, but Magni's case was not strictly one of corneal gumma, as the growth began in the conjunctiva and involved the cornea secondarily.

V. SYPHILIS OF THE SCLEROTIC.

Syphilitic lesions of the sclerotic, originating in this fibrous membrane, and distinct from processes involving the other coats of the eyeball, are tolerably rare. It was formerly supposed that the scleritis was always accompanied by iritis, or cyclitis. Mooren was probably the first to describe a syphilitic episcleritis, in 1867, but he was soon followed by Galezowski and Higgens. To the end of more accurate diagnosis, syphilitic processes in the sclerotic may conveniently be divided into three classes, viz.: 1. Episcleritis, or superficial scleritis. 2. Scleritis parenchymatosa. 3. Scleritis gummosa, or gummous nodule of the sclerotic.

The first two classes may be both circumscribed and diffuse, and differ from each other mainly in severity and extent.

1. **Episcleritis**, or superficial scleritis, is the name given to one or more patches of deep congestion on the eyeball, of varying size, accompanied by more or less thickening of the superficial layers of the sclerotic and perhaps of the episcleral connective tissue, and a corresponding elevation of the conjunctiva over the affected spots. The vascular injection is peculiar in character, deep red or almost purple in color, and looking more like a blotch or splash than a mass of distinct blood-vessels. There may be more than one of these patches, but they never involve the entire circumference of the sclerotic. This injection is very deep, and is always accompanied by a conjunctival injection, which masks more or less completely the limits of the scleral injection. This is a comparatively rare disease, and is much more often due to rheumatism or gout than to syphilis. The patches of injection and infiltration may occur at any part of the sclerotic, but are usually in the vicinity of the ciliary region, though they may extend back beyond the equatorial region of the eyeball. The elevation is generally slight, and the pain limited to a dull ache. Iritis may be present, but this is not common. The disease is chronic and sometimes lasts for months, fresh patches springing up

even while the old ones are being absorbed. If the process be a true, superficial scleritis, the disease subsides without leaving much permanent discoloration of the tissue.

2. **Scleritis Parenchymatosa** is simply a more severe type of the same disease, and involves the deeper layers of the sclerotic. Here also the patches are usually circumscribed, though there may be several of them. The injection is deeper in color, the infiltration is more extensive, and in consequence the conjunctiva is more prominently elevated by reason of the greater exudation. There is always a sense of pressure in the eye, accompanied by dull aching, and in some cases severe pain of a boring character. The infiltration is interstitial, and the process may be complicated by iritis or cyclitis, though this is rare. The disease is very chronic; may run its entire course without any accompanying lesion in any part of the uveal tract, and rarely, if ever, ends in suppuration and ulceration. It always leaves behind it a bluish or bluish-brown discoloration, of which it is by no means easy to say whether the discoloration is caused by pathological staining of the tissue, or is due to the pigment of the ciliary body and chorioid showing through a thinned and atrophied sclerotic. In some cases of great chronicity the sclerotic becomes very much thinned from atrophy and absorption of its tissue, and this allows the chorioidal pigment to become visible, and also favors the development of ciliary and equatorial staphylomata.

3. **Scleritis Gummosa, or Gumma of the Sclerotic**, is a purely localized infiltration into and upon the sclerotic, distinctly circumscribed, but with somewhat diffuse margins. The infiltration here is so extensive and so definitely limited that the projection above the surrounding surface is very marked, and the growth, though flattened, sometimes attains a large size, measuring in some instances from two to two and a half centimetres in their long diameter, and from a quarter to half a centimetre in height (Plate XXI, Fig. 2). Cases of scleral gummata have been reported by Hirschberg, Barbar, C. S. Bull, Loring, Sturgis, Alexander, Andrews, and others. The course of the infiltration is usually from within outward, though it may be the reverse. These guminatous deposits usually occur in the course of the straight muscles of the eye, and are more frequent on the temporal side of the eye than elsewhere. This has led some observers to think that in these cases the infiltration starts from the sheath of the tendon or from the capsule of Tenon. They are moderately hard, slightly nodulated, sensitive to the touch, and apparently highly vascularized. The conjunctiva is usually movable over the growth, and the conjunctival vessels are enormously engorged and very tortuous. In addition to the pain there is usually some photophobia and some stiffness in the motions of the eyeball, though no very decided limitation of motility.

Treatment.—Hot applications seem to be of no use in lesions of the

sclerotic. Locally a solution of atropia and eocaine should be used if there is any pain, a few drops being instilled every two or three hours as an anodyne and contractor of the caliber of the vessels. If no pain is complained of and no iritis is present, a solution of eocaine (four grains) and of pilocarpine (four grains) should be employed. Remembering the extreme chronicity of these scleral lesions, the constitutional treatment should be persisted in to the end, the potassium iodide being given in constantly increasing doses until toleration is reached, at times together with mercurials and at times alone.

VI. SYPHILIS OF THE UVEAL TRACT, OR IRIS, CILIARY BODY, AND CHOROID.

Constitutional syphilis may affect the entire uveal tract, iris, ciliary body, and choroid, in one eye alone or in both eyes simultaneously; or it may involve the iris or choroid alone, the rest of the vascular or pigmented coat of the eye remaining intact. It is very doubtful whether the ciliary body is ever alone affected, owing to its situation between the iris and the choroid and its close union with the sclerotic. Any lesion of the uveal tract is of serious import, and the prognosis is always more or less unfavorable, because of the great danger of interference with the function of vision.

I. SYPHILIS OF THE IRIS.

One of the most frequent symptoms of constitutional syphilis, and by far the most frequent complication on the side of the eye, is iritis. As a rule, only one eye is at first attacked, though the other eye may and usually does become soon affected. In some cases both eyes are simultaneously involved. Men seem to be more subject to iritis than women. It is, in the great majority of instances, an early lesion of constitutional syphilis, sometimes occurring during the existence of the initial lesion, or chancre, though in rare cases it may be met with as a late manifestation of disease. The attack may be acute, subacute, and chronic, though the latter is very rare.

Iritis, occurring in the course of constitutional syphilis, may be of three kinds, viz., plastic, serous, and gummatous. The first two varieties do not differ at all in their subjective and objective symptoms from iritis due to other causes, and are not pathognomonic of syphilis. The sole variety of iritis absolutely indicative of syphilis is the iritis gummosa, or gumma of the iris, and to this variety alone should the term "syphilitic iritis" be applied.

Symptoms.—Plastic iritis is marked by the following symptoms:
1. The presence of the deep ciliary injection, forming a zone of short, deep, straight vessels immediately around the corneal margin; this may or

may not be accompanied by an injection of the conjunctival vessels, which are superficial, long, and tortuous, running from the *cul-de-sac* toward the margin of the cornea. 2. Slight turbidity of the aqueous humor. 3. Swelling and discoloration of the iris, sometimes confined to the region of the sphincter iridis, and sometimes involving the whole iris. 4. Marked sluggishness of the iris, due to infiltration of its stroma; or absolute immobility of the iris, due to the existence of adhesions or posterior synechiæ between the iris and the capsule of the lens. 5. Irregularity in the shape of the pupil, due to the presence of one or more posterior synechiæ. 6. Exudation in the field of the pupil attached to the sphincter margin of the iris or to the capsule of the lens, and coming from the posterior surface of the iris. 7. Photophobia, or intolerance of light. 8. Lachrymation. 9. Disturbance of vision. 10. Pain. 11. Increased tension of the eyeball (Plate XXI, Figs. 5 and 6). All these symptoms may be present in any given case, particularly if it be severe, though some of them are frequently absent. Pain is generally present, and sometimes it is very severe. The ciliary injection, discoloration, and sluggishness of the iris, irregularity of the pupil, and disturbance of vision, are always present.

Serous Iritis.—In this form the aqueous humor is always turbid, the iris is discolored and sluggish, the ciliary injection present, and there is a deposit on the endothelial cells of the membrane of Descemet on the posterior surface of the cornea. The intraocular tension may be increased. The symptoms in this form of iritis are usually less strongly marked than in the plastic form, but they are apt to be more chronic in character. Serous iritis is also more apt to be accompanied by cystitis or choroiditis of a similar serous character, and may thus give rise to the group of symptoms forming the disease known as glaucoma.

Iritis Gummosa.—The only form of iritis pathognomonic of acquired syphilis is the *iritis gummosa*. Here, in addition to some or all of the symptoms above mentioned, there may be seen in or on the iris one or more distinct nodular elevations, yellowish or yellowish-red in color, varying in size from a hemp seed to a small pea, situated at the pupillary margin, or ciliary border, or between the two, and showing a tendency to coalesce (Plate XXI, Fig. 7). They may appear distinctly vascularized. This form of iritis has been called by Alexander “iritis papulosa,” and this author confines the term “gumma of the iris” to that form in which the nodule is solitary, always at the ciliary margin, of the size of a pea or larger, and tending to involve the ciliary body. He says that such a gumma disappears by fatty metamorphosis, leaving a permanent scar and producing atrophy of the iris tissue. He thinks that iritis papulosa may occur at a comparatively early period of constitutional syphilis, while the true gumma of the iris is always a late lesion, and is not very common.

Prognosis.—This is fairly good in the plastic and serous forms of inflammation, but doubtful in the gummatus form, owing to the tendency of the lesion to involve the ciliary body and induce atrophy of the eyeball, and to the generally cachectic state of the patient. The danger in the plastic variety, particularly if the patient is not seen early enough, is the blocking of the pupillary space by masses of exudation, and the formation of numerous broad, firm, posterior synechiæ, both of which conditions cause marked diminution of vision and even its entire suppression, and, by closing the channel of communication between anterior and posterior chambers, tend to develop the condition of glaucoma.

The danger in the serous form of iritis is the possibility of its extending to the ciliary body and choroid, thus setting up a serous inflammation of the whole uveal tract and ending in glaucoma.

Treatment.—In all forms of iritis the treatment should be both local and constitutional. In all three forms of inflammation the local remedies should consist in frequently repeated applications of hot water to the closed lids, and to the more or less frequent instillation of a solution of atropia. If adhesions between iris and capsule of the lens have already formed, atropia must be instilled frequently. If the pain is very severe, relief is frequently afforded by leeches to the temple. If opiates are really required, a strong solution of atropia, even as high as a four-per-cent solution, must be instilled, to counteract the effect of opium in contracting the iris. If we succeed in breaking the adhesions by atropia, the battle is half gained. The internal or constitutional treatment should consist, of course, in the administration of mercurials and potassium iodide. In the iritis *gummosa* it is very important to bring the patient as rapidly as possible under the influence of mercury and potash. The latter may be pushed to toleration, but the mercury should always be administered in combination with ferruginous tonics and dilute hydrochloric acid. It is sometimes important to administer the mercury externally in the form of ointment. Hot water and atropia should of course be applied locally.

Very often cases of iritis, particularly the plastic type, end in permanent adhesions between the iris and the lens. These require subsequently operative interference, the object being twofold: First, because the continued presence of these synechiæ are a constant source of irritation, which may tend to cause a relapse of iritis; and, secondly, because they may engender the glaucomatous condition. This latter danger may be regarded as always present, if the adhesions are continuous all around the sphincter margin of the iris. The operation indicated here is what is known as iridectomy, and consists in removing a segment of the iris, from ciliary margin to sphincter, of varying width, according to the number and breadth of the adhesions present.

II. SYPHILIS OF THE CILIARY BODY.

Cyclitis.—Inflammation of the ciliary body, like iritis, may be plastic, serous, or gummatous in character. It is a grave disease, and tends naturally to destruction of the eye. Its prognosis is always unfavorable, especially in the gummatous form of the disease. It is markedly chronic in its course, and, contrary to what generally prevails in iritis, the intra-ocular tension is usually diminished. The most marked symptoms are severe pain, and extraordinary sensitiveness to pressure on the eyeball.

Diagnosis and Symptoms.—The symptoms of *plastic cyclitis* are usually ciliary injection, severe pain, diminished tension, more or less marked disturbance of vision, usually due to exudation into the vitreous humor, and a plastic exudation into the posterior chamber, between the posterior surface of the iris and the suspensory ligament and anterior capsule of the lens. The ciliary injection may not be very marked. As a distinct disease, without a similar inflammatory process in either iris or choroid, it is of rare occurrence, and many authors deny its existence, claiming that the iris and choroid are always involved, and that the disease is really an irido-choroiditis. As a matter of clinical observation, in almost all cases we find a turbid aqueous humor, punctate deposits on the membrane of Descemet, a deep, anterior chamber from apparent retraction of the iris, flocculi in the anterior part of the vitreous humor, with patches of choroiditis. In plastic cyclitis we look for a diminished tension, but in serous cyclitis the tension may be slightly elevated at first. It may subsequently become normal and remain so, or the eye may take on a permanent condition of increased tension. It is very difficult to distinguish between what is a plastic and what is a serous cyclitis, but the former is usually accompanied by iritis, the pupil becomes blocked by exudation, the posterior chamber becomes filled by a similar exudation, and the iris protrudes toward the cornea at the periphery, while the sphincter of the iris seems to be drawn backward, being firmly adherent to the capsule of the lens. A glaucomatous condition then results, as the posterior synechiæ are very tough and firm, and can not be made to yield to any procedure short of the knife. In serous irido-cyclitis, while the adhesions of the iris to the lens are usually very firm, causing what is known as seclusion of the pupil, the exudation behind the iris is more apt to be fluid, but the same glaucomatous condition is apt to arise, particularly if the choroid has become so far involved in the serous inflammation that the posterior lymphatic channels in and around the sheath of the optic nerve have become obliterated.

Cyclitis Gummosa.—The gumma may originate in the iris and extend to the ciliary body, or it may originate in the ciliary body itself. In the latter case it has a strong tendency to extend to the sclerotic, and

may also involve the iris. The intra-ocular tension is apt to be diminished in these cases, and in bad cases the eye becomes very soft. Occasionally, when the iris is not involved, or the pupil has become widely dilated by atropia, the gumma may be seen within the eye by examination with the ophthalmoscope. In pronounced cases there is sometimes a distinct external projection in the ciliary region simulating a staphyloma, but from this it must be carefully differentiated.

In any form of cyclitis the prognosis is always unfavorable, and it should not be forgotten that the disease, in the serous form at least, tends to the development of the glaucomatous condition; while in the gummatous form the tendency is always to atrophy of the ciliary body and shrinking of the eyeball or phthisis bulbi.

III. SYPHILIS OF THE CHORIOID.

Next to the iris, the chorioid is the most frequent seat of syphilis in the eye. Syphilitic chorioiditis may be divided into two classes: that which affects the anterior segment of the chorioid, and which is usually connected with inflammation of the ciliary body and iris; and that which is more or less closely confined to the posterior segment of the chorioid and rarely spreads beyond the equator of the eyeball. No form of chorioiditis is strictly pathognomonic of syphilis, and the diagnosis must rest upon the history of the case.

In chorioiditis anterior, or irido-chorioiditis, a disease of a severe type, the symptoms are a sudden diminution of the vision, in consequence of severe preceding iritis, boring pain in the eye, dense opacities of the vitreous which obscure the fundus, sudden diminution of intra-ocular tension, followed later by as sudden an increase in the tension, photopsic manifestations of various kinds, and finally the formation of cataract, and possibly of staphyloma of the ciliary and equatorial regions. In the worst cases the results are destruction of all the coats of the eye, atrophy of the iris and ciliary body, shrinking of the vitreous, and detachment of the vitreous or retina.

Another form of *chorioiditis anterior* is the serous variety, characterized by more or less extensive opacities of the vitreous in its anterior portion, which are sometimes so dense that vision is reduced to perception of light. It may be preceded or followed by a serous iritis. The tension is apt to be abnormally increased and the pain severe. If taken in time the prognosis of these cases is favorable, if the administration of mercury is pushed to extreme toleration.

The so-called *chorioiditis posterior*, met with in syphilitic patients, is an exudative chorioiditis appearing under various forms, to which collectively it would be better to apply the term chorio-retinitis, since the retina is almost always involved in the process. Various authors have at differ-

ent times reeognized and deseribed three different forms of syphilitic ehoroiditis, viz.: 1. Smooth, reddish or yellowish patches appearing at the periphery of the fundus, which soon assume an atrophic aspect and are surrounded by a zone of pigment (Plate XXII, Fig. 1). 2. Larger, slightly elevated, sharply defined, whitish or yellowish patches, situated near the posterior pole of the eye, around the optie disk and maacula lutea, aecompanied by marked disturbanee of vision (Plate XXII, Fig. 2). 3. A form of ehoroiditis eharacterized by similar patches in the posterior segment of the ehoroid, of rather rapid growth, with a tendeney to coalesce, and aecompanied by fine, fixed, dustlike opaeities in the vitreons, and some floating opaeities, with very marked and sudden diminution of vision. In all three varieties there is a constant tendeney to the heaping up of masses of pigment around the patches of exudation.

Diagnosis.—It is by no means easy to sharply differentiate these different varieties of inflammation. The ehoroiditis disseminata of the first two varieties may appear simultaneously with the third or diffuse ehoroiditis. As a result of this, a very extensive atrophy of the superficial pigment is sometimes met with; while in other eases the pigment seems to be inereased in quantity and rolled togther in great masses, making a very striking ophthalmoseopie picture. To this form the name of chorioiditis disseminata pigmentosa has been given.

Symptoms.—In all the forms of ehoroidal inflammation, opaeity of the vitreons is a eommon symptom. It is sometimes diffuse and dustlike in eharaeter, but more frequently it eonsists of eobweblike struetures or dense membranous formations. The latter are more often found in the posterior parts of the vitreons, while the dustlike opaeities occupy the anterior portion of the vitreous. They are sometimes fixed and sometimes floating, the eobwebs and membranes appearing blaek against the general red baekground.

The eourse of ehoroiditis is always ominous, unless reeognized early and promptly neutralized by aetive treatment, though the prognosis is probably more favorable in the syphilitic form of the disease than in ehoroiditis due to other eauses. The gravity of the disease is due to the frequent eomplieation with retinitis, and to the tendeney to inflammation and atrophy of the optie nerve, indued by the ehronic and persistent eharaeter of the disease. The larger the patches of exudation, and the nearer they approach to the region of the maacula lutea, the more they permanently endanger eentral vision, and hence the more unfavorable the prognosis. The moment the region of the maacula is involved a eentral scotoma appears in the field of vision. In the more peripheral forms of the disease the vision is not mueh affected, exept by the presenee of the vitreous opaeities.

Gummatous deposits are rarely, almost never, met with in the ehoroid.

Occasionally a severe case of gumma of the ciliary body may extend anteriorly into the iris and posteriorly into the choroid, but even here it is only the periphery of the choroid that becomes involved.

Treatment.—The treatment consists in the local instillation of atropia to paralyze the ciliary muscle, the occasional application of a leech to the temple, and the wearing of smoked glasses. Mercurial inunction should be employed freely, and mercury should be given in some form internally. If the optic nerve becomes affected, the local abstraction of blood is contraindicated, and strychnine should be administered either hypodermically or by the mouth.

IV. SYPHILIS OF THE CRYSTALLINE LENS.

Syphilis never attacks the lens primarily or independently. Opacities of the lens itself, and of the capsule, as well as capsulitis, always result from interference with its nutrition, and are only met with as consequences of inflammation of the uveal tract.

V. SYPHILIS OF THE VITREOUS HUMOR.

Hyalitis, or inflammation of the vitreous humor, never occurs primarily as a symptom of constitutional syphilis, but is always due to inflammation of the uveal tract, especially choroiditis.

VII. SYPHILIS OF THE RETINA AND OPTIC NERVE.

I. SYPHILIS OF THE RETINA.

Syphilitic inflammation of the retina may be divided into five varieties, as follows, in the order of frequency: 1. *Chorio-Retinitis*, in which the retina becomes involved secondarily in consequence of the various forms of syphilitic choroiditis. 2. *Simple Retinitis*, in which the optic papilla and central parts of the retina are obscured by a faint, mistlike opacity, while the periphery of the fundus is intact. 3. *Retinitis* with *exudation* along the retinal vessels. 4. *Retinitis* with *hæmorrhages*, in consequence of disease of the blood-vessels and the formation of thrombi. 5. The *Central Recurrent Retinitis* of Von Graefe.

1. **Chorio-Retinitis.**—The retinitis occurring as a consequence of choroiditis, and forming the disease known as *chorio-retinitis*, is characterized by fine dust-like opacities in the vitreous humor, a general indistinctness of the fundus caused apparently by a delicate membrane or veil drawn over the disk and neighboring portions of the retina, behind which, however, the outline of the optic disk may be clearly defined. All this is due to an infiltration of the vitreous, which is at times difficult to recognize, and always signifies that the choroid is involved. As the case progresses other signs of choroiditis make their appearance, such as distinct

patches of exudation, sometimes isolated, sometimes arranged along the course of the blood-vessels, and more or less completely surrounded by irregular masses of pigment. The participation of the retina in the inflammatory process is further corroborated by the presence of scotomata in the field of vision, diminution of the central and peripheral vision, micropsia, and metamorphopsia.

2. Simple Retinitis.—This inflammation, strictly confined to the retina, and first described by Jacobson, is a much rarer disease than the preceding one, and its existence has often been disputed, mainly because ophthalmologists have differed as to the form of inflammation of the retina which occurs in syphilis. It is usually diffuse in character, and characterized by the following ophthalmoscopic symptoms: The fundus may be generally faintly cloudy and indistinct, or there may be a distinctly defined mistlike, grayish opacity extending over the papilla, and like rays along the course of the blood-vessels toward the periphery. Toward the equator of the eyeball this mist disappears entirely and the fundus presents its normal appearance. The outlines of the papilla are blurred or washed out, and the disk is entirely surrounded as well as covered by a zone of gray, hazy retina. The disk may appear very hyperæmic, the congestion being much more vivid than that existing in the rest of the fundus (Plate XXIII, Fig. 3). The arteries are somewhat reduced in caliber, or seem so in comparison with the engorged condition of the veins. The latter are only partially concealed by the general œdematous cloudiness, and in places appear clearly and with a widened irregular reflex. They are often very tortuous, but the curves of these tortuosities are not perpendicular to the plane of the retina, as in optic neuritis, but rather coincide with this plane. There are no floating opacities nor any fixed, dustlike opacities in the vitreous, and the reflex of the retinal opacity passes through a clear medium to the eye of the observer. The subjective symptoms are as follows:

1. Diminution of central vision, sometimes slight, sometimes very marked, the visual acuity falling to a tenth and in rare cases to one-hundredth of the normal. When the loss of vision is marked it is due to central scotomata, which are usually annular, though never completely so. Sometimes, however, these defects in the field of vision are sector like, and extend far toward the periphery.

2. Hemeralopia, or so-called "night-blindness," in which the acuity of vision rapidly diminishes as the light fails. Such patients can scarcely find their way about in the evening or in dark places.

3. Photopsic manifestations, such as transparent bright spots, which vibrate or rotate rapidly around the fixation point.

4. Micropsia and metamorphopsia.

5. Photophobia and sometimes lachrymation in consequence.

The prognosis of simple syphilitic retinitis is usually favorable, especially if promptly treated. The vision is gradually restored, the cloudy fundus clears up, and the scotomata disappear. The disease is, however, subject to frequent relapses, and if treatment prove futile the case ends in atrophy of the retina, choroid, and optic nerve, with development of pigment in the choroid and outer layers of the retina. When the choroid becomes involved, opacities appear in the vitreous, and are more or less permanent. When the optic nerve becomes atrophied the disk assumes a distinctly dirty-yellow hue very different from the dense white or bluish-white appearance usually met with in atrophy from other causes.

3. Exudative Retinitis.—This variety is less common than the preceding forms of inflammation. Here the inner layers of the retina are involved, and the process is distinguished by more or less extensive exudation of a yellowish deposit in the form of irregular patches in the inner layers of the retina, sometimes distinctly elevated above the surface. These may be scattered all over the fundus, but are usually grouped around the posterior pole of the eye. There is usually some exudation on the head of the optic nerve, and the vessels are more or less obscured. This form of inflammation may be accompanied by hæmorrhages, which are usually grouped around the patches of exudation, but sometimes are observed along the blood-vessels.

4. Retinitis with Hæmorrhages, in consequence of endarteritis and the formation of thrombi, is a rare form of syphilitic disease. The ophthalmoscopic image of such a case does not differ in any respect from the same variety of retinitis due to some other cause than syphilis. The hæmorrhages are numerous and of all varieties, though they are more apt to be punctate or circular. The veins and arteries possess the usual appearances of disease of the vascular walls, and there are the same disturbances of the circulation and the same general œdematous condition of the retina. The changes in the walls of the blood-vessels are sometimes very marked.

5. The Central Recurring Retinitis, first described by Von Graefe, is the rarest of all the varieties of syphilitic retinitis. It is characterized by an opacity in the vicinity of the macula lutea, and the appearance of small, white, punctate dots grouped together in the macula. The disturbance of vision and the opacity or cloudy infiltration round the macula appear suddenly, but generally disappear in a few days, only to recur in a few weeks. In subsequent attacks, in addition to the punctate deposit at the macula, there occur irregular white streaks, radiating from the optic disk into the retina, usually in the course of the vessels, which are sometimes distinctly elevated, and also the same punctate deposits scattered all over the fundus.

II. SYPHILIS OF THE OPTIC NERVE.

Syphilitic affections of the optic nerve, whether in its orbital, intra-cranial, or intra-cerebral portions, can not be certainly diagnosticated by the quality or intensity of the symptoms, but rather by the peculiar combination of the symptoms in a given case. The optic nerve may be affected by syphilis in two ways: either marked by visible changes in the optic papilla, or accompanied by no demonstrable changes in the disk. Where there are visible changes in the papilla, these may be of three kinds, viz.: 1. There may be choked disk or papillitis as a symptom of all the various intra-cranial processes. 2. There may be neuritis descendens accompanying the various encephalic and meningeal processes, which have extended along the sheath of the optic nerve and involved the substance of the nerve, or it may arise from a gumma in the nerve. 3. There may be atrophy of the optic nerve, the result of choked disk due to some intra-cranial process, or of neuritis descendens due to some encephalic or meningeal process, or to some spinal lesion.

When there are no demonstrable ophthalmoscopic changes in the papilla the symptoms are—1, either an amblyopia or amaurosis syphilitica, due to disease of the blood-vessels, which may either be transient or end in atrophy of the optic nerve; or, 2, hemianopsia dependent on disease of some portion of the optic tract between the chiasm and the occipital lobe, which leaves a permanent defect; or, 3, a flitting scotoma.

The optic nerve may be affected in some portion of its entire course between eye and brain independently, or secondarily by propagation of the morbid process from the surrounding tissues. In almost all intense inflammatory processes in the retina, the optic disk or papilla is also involved, and the lesion is therefore a neuro-retinitis. The papilla is slightly swollen, its outlines are indistinct, the central vision is decidedly diminished, while peripheral vision and the color sense are but slightly affected (Plate XXII, Figs. 3 and 4). Two varieties of neuritis must here be differentiated the one from the other—choked disk or papillitis and neuritis descendens. Both these forms of inflammation, when both eyes are simultaneously affected, prove that the process has involved either the optic nerve or the sheath or both, and further observation must then decide whether the lesion is intra-cerebral, extra-cerebral, intra-cranial, or orbital in situation.

Papillitis.—Inflammation of the intra-ocular end of the optic nerve is characterized by an intense, steep, irregular swelling of the optic disk, the outline of which is concealed by the oedematous infiltration, marked stasis in the retinal veins, and ischæmia in the retinal arteries (Plate XXIII, Fig. 1). In neuritis descendens, on the contrary, the papilla is much less oedematous, and there is little or no condition of stasis in the retinal veins,

but the opacity and œdema are apt to extend farther into the retina, and are frequently accompanied by hæmorrhages and whitish patches of exudation. In addition, we sometimes meet with a ring of small, white, punctate exudations around the macula lutea, resembling those seen in retinitis albuminurica. Still, it is not always easy to distinguish the one form from the other, for both forms may coexist simultaneously.

While bilateral papillitis points to the existence of some intra-cranial process which has caused an increase of the intra-cranial tension and thus indirect compression of the optic nerve, neuritis descendens indicates the presence of an inflammatory process, which has involved either the sheath of the optic nerve or the nerve itself, and this is generally basilar meningitis.

While papillitis indicates the presence of an increased intra-cranial tension, it does not indicate whether the cause of this increased tension is a sarcoma, or an echinococcus cyst, or a gumma, nor does the ophthalmoscopic picture enable us to locate the lesion. If the papillitis is unilateral, the lesion may be situated entirely within the orbit; but if it is bilateral, the seat of the lesion is in all probability central. The syphilitic nature of the process must, however, be diagnosticated from the history of the case and the accompanying symptoms.

Syphilitic lesions of the brain may be either a circumscribed gummy tumor, or morbid processes in the large blood-vessels, especially at the base, or diffuse gummy infiltration of the membranes at the base or on the convexity, which involve the brain substance secondarily. A circumscribed gumma occurs most frequently in the dura mater, either between dura and bone or between dura and arachnoid, more rarely in the subarachnoid space, whence it may extend to the brain substance. It is rarely met with in the interior of the brain. The morbid changes in the great vessels occur in the elastic lamella of the intima and in the endothelium. These narrow the lumen of the vessel, and thus cause thrombosis, which is sometimes complete.

If a gumma be suspected, the first step is to determine whether it is at the base of the brain or in the cortex. Gummata of the base usually cause lesions of other cranial nerves besides the optic, such as the third, sixth, and seventh. Gummata at the convexity frequently cause symptoms of nervous irritation, and even epileptiform attacks.

The defect in vision does not always correspond to the visible ophthalmoscopic changes in the disk. Even with a most marked papillitis there may be very little disturbance of vision and no defect in the visual field, and this is explained by the fact that the layer of rods and cones of the retina are still intact. In other cases, where the papillitis may be less marked, especially if neuritis descendens is also present, the axis-cylinders are involved in the process, and there is very marked disturbance of vision.

Neuritis Descendens.—This depends upon inflammatory changes in the nerve substance itself, and is usually caused by an extension of an inflammatory process from the surrounding tissue to the sheath of the nerve and thence to the nerve-fibers, or by its pressure setting up an irritative and inflammatory process in the nerve, and this process may extend even from the central parts of the brain.

Unilateral neuritis descendens points to the presence of a lesion in the corresponding nerve-trunk between the chiasm and the orbital end of the nerve. *Bilateral neuritis descendens* points to a lesion in the nerve somewhere between the chiasm and the occipital lobe. The most common causes of neuritis descendens are encephalic and meningeal processes, but further than this we can not go, merely from the ophthalmoscopic examination. The origin of these cases is probably to be found in diseased processes in the walls of the vessels, first described by Heubner, particularly in the basilar arteries and the arteries of the fissure of Sylvius and their branches.

In neuritis descendens, peripheral vision is usually first affected, and the defect gradually extends to central vision; while in perineuritis the reverse occurs, central vision being first affected, and thence the defect extends to the periphery of the field. This depends upon the peculiar arrangement of the nerve-fibers in the optic nerve. The fibers at the periphery of the nerve are distributed to the region of the macula, while the central fibers supply the periphery of the retina.

Both papillitis and neuritis descendens may end in atrophy of the optic nerve if not properly treated.

Atrophy of the Optic Nerve.—Three forms of atrophy of the optic nerve, due to syphilis, are met with, as follows: 1. Neuritic or inflammatory atrophy, the result either of papillitis or neuritis descendens. 2. Cerebral atrophy. 3. Spinal atrophy.

1. *Inflammatory Atrophy.*—Here the optic disk is opaque, of a dirty, grayish-blue color, with blurred, irregular outline, the point of exit of the vessels obscured as by a mist; the arteries are reduced to threads and surrounded by white streaks, due to a thickening of their adventitia, and the veins are reduced in caliber.

2. In the *Cerebral Form of Atrophy* the disk is brilliantly white, the outline is sharply defined, the lamina cribrosa is very distinct, and the arteries and veins are only slightly reduced in caliber (Plate XXIII, Fig. 2).

3. In the *Spinal Form of Atrophy* the papilla is bluish or bluish-green in color, the outline is sharply defined, the lamina cribrosa is very brilliant, and the vessels are but slightly reduced in caliber. The latter is the form which is met with in spinal processes due to syphilis, especially locomotor ataxia.

In the cerebral form of atrophy the cause has been some process in the brain which, by setting up some disturbance in the circulation or by direct compression of the optic nerve, has led to descending atrophy of the disk, without any ophthalmoscopic sign of inflammation.

Finally, we have to consider those cases in which there is no ophthalmoscopic evidence of disease of the optic nerve. Here we must depend entirely upon the presence of functional disturbances to form an opinion as to the location of the lesion. These cases have received the names of amblyopia and amaurosis syphilitica. If the loss of vision is confined to one eye, the lesion may be in front of the chiasm, though it may be cerebral in origin, and situated in the posterior part of the internal capsule, or even in the cortex. If it is in the internal capsule, there is also present contralateral anæsthesia of the other cranial nerves and of the surface of the body, which will not be present if the lesion is in the cortex. In many of these cases it is possible that eventually some signs of atrophy will appear in the optic disk.

In *Hemiopia Fugax*, or flittering scotoma, and in typical hemianopsia, there may be absolutely no ophthalmic evidence of disease. Both these forms of defect in the visual field must be regarded as due to a lesion in one optic tract. In hemianopsia lateralis sinistra the lesion must be sought in the right optic tract. In hemianopsia lateralis dextra it is in the left optic tract, between the chiasm and the occipital lobe of the cerebrum, and usually between the cerebral peduncle and the chiasm.

VIII. SYPHILIS OF THE OCULAR MUSCLES AND MOTOR NERVES.

So far as our present knowledge goes, pure myopathic processes are met with very seldom in the ocular muscles, for the syphilitic lesion almost always involves either the motor nerves or their nuclei. The site of a lesion causing paralysis of one or more of the ocular muscles may be either cerebral, basilar, or orbital. In the latter case we must distinguish between neuropathic and myopathic lesions. It may, however, be assumed *a priori* that syphilitic lesions of the orbital walls, which are here the most frequent, can not readily be conceived as involving the nerve alone, as the origins of the ocular muscles are grouped closely around the entrance of the optic nerve, and the bony margin of the foramen is narrow.

Syphilitic lesions in the intra-orbital portion of the motor nerves have never been reported. It might happen that the lesion would involve the muscle alone, but no cases of pure muscular disease in the orbit have ever been published, though Zeissl has assumed such a condition in one case reported by himself. Small exostoses or slight periosteal swellings

would not be likely to excite muscular paresis, owing to the protection afforded by the presence of the orbital cellular tissue, with the exception, perhaps, of the superior oblique muscle, which runs closely along the roof of the orbit. Larger tumors of this region, by congestion and direct pressure, would cause such marked changes of shape and situation of the eyeball that a simultaneous muscular paralysis would probably not be noticed. Hence, paralyzes of the ocular muscles of orbital origin have been rather assumed to exist than actually observed.

Our knowledge of the intra-cranial causes of syphilitic paralysis of the ocular muscles is more exact. The dura mater, like the periosteum, is a favorite seat of syphilitic disease, especially gummy infiltration. Such lesions occur on the convexity as well as at the base of the brain, but particularly in the latter. The third or oculomotor nerve, passing through the dura, along the side of the sella turcica; the fourth, or trochlear nerve, which makes its exit at the apex of the pyramid; and the sixth or abducens nerve, which makes its exit at the upper part of the sloping surface of the body of the sphenoid, are all very apt to be involved by lesions situated at the base of the skull. Furthermore, the arachnoid and pia mater may be the seat of syphilitic lesions, even at an early period of constitutional syphilis, without the dura mater being involved.

In the brain substance itself—that is, in the pons, the corpora quadrigemina, the cerebral peduncles, and cerebellum—the causes of ocular paralysis are much more rarely met with. They occur more commonly when the meningeal processes extend into the brain substance along the vessels, compress the latter, and by cutting off the blood-supply cause necrobiosis, and give rise to patches of softening. Syphilitic endarteritis, so graphically described by Heubner, by means of cellular development between the endothelium and the connective tissue beneath, and by accidental inflammation of the muscular and adventitious coats, plays an important part in the causation of cerebral lesions, since it causes narrowing and obliteration of the vessels with all their consequences. But, from the nature of the vascular distribution, this form of lesion rarely has any effect in inducing disturbance of motility of the ocular muscles.

Another possible cause of ocular paralysis, though very rare and but recently recognized, is gumma of the brain substance. Another probable cause is found in certain little understood irritative conditions, or chronic inflammation of the neurilemma and perineurium of the brain substance, or of the nerves themselves. Virchow thinks that the simple ossifying or gummatous meningitis of the base of the brain is the most frequent cause of the syphilitic paralysis of the ocular muscles. A meningitis in the vicinity of the sella turcica, for instance, would almost certainly involve the foramen opticum.

The question of the orbital, meningeal, or cerebral location of the lesion is still very uncertain. If the existing paralyses are symmetrical, the lesion is probably not in the orbit. Intense headaches, with complete paralysis of one or more nerves, as well as equal paresis of all branches of the third nerve, or bilateral muscular disease with complications on the side of the optic nerve and trifacial nerve, point to the existence of a meningeal lesion, so long as there are no symptoms indicating the existence of foci of cerebral disease. We may also assume the presence of a central lesion when the paralysis is incomplete in extent and intensity, and remains unilateral and single. Spots of softening and gummata must involve relatively considerable space, in order to affect collectively fibers, which in their course through the brain diverge so far from each other. The root of the oculomotorius is of great extent, for, in its course through the cerebral peduncles to the corpora quadrigemina it partially surrounds and partially traverses the nucleus tegmenti and the cerebellar crus. Lesions anywhere in the course of this nerve might give rise to the most varied forms of ocular paralysis.

Another possible lesion is, that a focus of disease may simultaneously destroy the function of the third and fourth nerves, or the sixth and seventh nerves of one side, since the nuclei of the third and fourth nerves are as close together as the nuclei of the sixth and seventh nerves. Furthermore, in endeavoring to diagnose the nature and location of these intra-cranial lesions, it should not be forgotten that the fourth, and probably also the third nerve, undergoes an intra-cerebral decussation, while the sixth or abducens nerve does not.

Statistics gathered from many sources seem to show that the majority of all cases of ocular paralysis are limited to a branch of the third or oculomotor nerve. The only possible explanation of these cases is to assume that the lesion has involved a part of the nerve-nucleus, or a branch of the nerve after its division in the orbit; for a lesion attacking the entire bundle of fibers at the base of the skull would not easily destroy one group of functionally connected fibers and leave all the others intact.

Complete paralysis of one or both third nerves is almost always caused by a lesion situated in the intra-cranial though extra-cerebral portion of the nerve.

The *symptomatology* of paralysis of the ocular muscles is the same, whether the cause be syphilitic or not. The most marked subjective symptom is diplopia, or double vision, which is of several kinds. If the patient, with both eyes open, sees any object of fixation doubled, there may be one or several muscles paralyzed. Generally speaking, if the double images are crossed, the right image corresponding to the left eye and the left image to the right eye, the nerve affected is the third, and this may be in one or both eyes. If the images are homonymous, on the

same side as the corresponding eye, the sixth nerve is affected. If there is a difference in the elevation or height of the images, the superior or inferior recti muscles are involved, which indicates again a lesion of the third nerve. If there is an inclination of the upper or lower ends of the double images toward each other, then either the superior oblique muscle is paralyzed, in which case the fourth nerve is involved, or the inferior oblique muscle is paralyzed, in which case it is again the third nerve which is the seat of the disease. When the entire trunk of the third nerve is diseased, there is ptosis of the upper lid from paralysis of the levator muscle, and on lifting the lid the eye is seen to be divergent, the iris is moderately dilated and immovable, and the accommodation is very limited or entirely absent, owing to paralysis of the ciliary muscle.

Partial paralysis of one or more muscles is much more frequently met with than total paralysis of all the muscles supplied by the third nerve.

The *prognosis* is good, if the case is seen early and proper treatment at once instituted and persistently pushed to toleration. The longer the paralysis has lasted the more unfavorable becomes the prognosis.

IX. SYPHILIS OF THE ORBITAL WALLS AND CONTENTS (EXCLUSIVE OF THE ADNEXA OF THE EYEBALL).

Disease of the bony walls of the orbit is not a very common manifestation of constitutional syphilis, though it is by no means rare. The lesions which occur here are: 1. A periostitis or osteo-periostitis, with or without subperiosteal abscess. 2. Gummy tumor or syphiloma of the periosteum. 3. Periostosis, hyperostosis, or exostosis of one or more bones. 4. Caries and necrosis, involving more or less of the entire thickness of the bony walls.

Some of the symptoms of these lesions are slight in severity and transient in duration, and often are not pronounced enough to attract the attention of any one but the patient. These lesions belong to the late stages of syphilitic infection, though the most recent investigations point to the existence of two forms of periosteal disease due to syphilis, which are to be distinguished from each other by the intensity of the process and the period of constitutional infection at which they occur. The cases of syphilitic osteitis and periostitis developed during the early period of constitutional taint are much less severe than those observed later. The latter are accompanied not only by subperiosteal and osseous gummata, but also by dense osteitis and necrosis. In all cases of syphilitic bone disease the exciting cause is generally found in contusions, repeated bruising, and slight injuries.

Osteo-periostitis.—Simple syphilitic periostitis or osteo-periosti-

tis, occurring as an early or precocious bone lesion, is limited to the surface of bone, to the periosteum and superficial layers. Under the periosteum, between it and the bone, are accumulated large numbers of round cells, analogous to the cells of the embryonic medulla. At the same time the deep layers of the periosteum are inflamed, and contain cells between the fibrous bundles. The neighboring connective tissue generally shows some inflammatory œdema. From a histological standpoint, simple osteoperiostitis of the bones of the orbit consists in the return of the cells between the bone and the periosteum to the embryonic state. The new osseous products consequent on periostitis, such as osteophytes, exostoses, enostoses, and eburnation, constitute the accidents common to all forms of syphilitic bone disease. The exuberant formation of the new osseous lamellæ may develop under the periosteum exostoses of varying size, and in the bone itself a parenchymatous hyperostosis and eburnation.

Gummous Periostitis.—The gummy osteo-periostitis is a variety of rarefying osteitis in which the subperiosteal embryonic tissue takes on the disposition observed in gummata. Gummata of bone, though common in the other cranial bones, are rare in the bones of the orbit. What are called external gummata originate beneath the periosteum, and by pressure gradually detach it from the bone. They also press upon the underlying bone, enter its substance in the form of a cone, the bone becomes infiltrated, and progressive rarefaction goes on up to a certain point. Then the gumma ceases to advance, undergoes lardaceous or fatty metamorphosis, and finally disappears, leaving in its place a more or less extensive depression in the bone. The frontal bone seems to be the region of predilection for these gummata. When a small gumma of the orbital periosteum has formed a cavity in the bone, and the inflammatory process has stopped, the new matter becomes caseous and atrophies; the peripheral periostitis heals, and there may be a partial reparation of bone. The cavity is not entirely filled, but the osteophytes developed beneath the periosteum end in a bony neoplasm at the margin of the loss of substance. If, however, the bone is completely perforated, the defect is filled up by a fibrous cicatrix.

The two essential signs of syphilitic orbital osteo-periostitis are pain and swelling, the former most intense at night and sometimes very violent. To these two symptoms is added a third, exophthalmus, or protrusion of the eyeball beyond the plane of the opening of the orbit, if the bony lesion be extensive or situated deeply in the orbit. The neuralgia, due to compression of a nerve filament at some point in its passage through a bony canal, is a common symptom. Subperiosteal gummata are generally accompanied by inflammation of the skin, long suppuration, necrosis of portions of bone which remain imprisoned for a long time, and which are eventually cast off, leaving behind great losses of substance.

These bony lesions are sometimes not recognized in the orbit during life, and are only revealed at the autopsy.

These lesions of the bony orbit, though generally regarded as late manifestations of constitutional syphilis, are by no means uncommonly met with early in the disease. In the adult, orbital periostitis, occurring as an early lesion, tends to resolution spontaneously, and when properly treated it rapidly subsides without leaving any trace. It is circumscribed, varies in duration between four and six weeks when left to itself, and disappears much sooner under proper treatment. Still, such an early lesion in the bones of the skull aggravates the prognosis, though the other constitutional symptoms may be slight. These cases of precocious periostitis are confined to the periosteum, are never followed by hyperostosis or exostosis, and never leave any trace of their presence. Large, hard, frontal bosses, which may involve the entire supraorbital margin, and dip down deeply in the orbit, rapidly disappear under appropriate treatment.

Two forms of periostitis, acute and chronic, may be distinguished. The *acute* form is almost always a precocious lesion. The patient complains of great pain in and around the eye, especially along the supra-orbital margin, which is excessively sensitive to pressure, even when the periostitis is deep-seated and does not involve the orbital margin. The eyelids are red and swollen, and the ocular conjunctiva is injected and sometimes chemotic. There is more or less protrusion of the eyeball, the exophthalmus being rarely straight forward, but usually toward one side or downward, owing to the periostitis being confined to one wall or part of the body. The general constitutional signs of inflammation are usually severe. There may be danger of loss of vision by pressure on the optic nerve in the optic foramen or in the orbit, or loss of the eye by strangulation of the entire blood supply of the globe by the infiltrated orbital tissue. Optic neuritis, followed by inflammatory atrophy of the optic nerve extending to the sheath of the nerve from the periosteum of the orbit and optic foramen, and simple atrophy of the optic nerve from pressure by the surrounding infiltrated tissues, are not very uncommon results of orbital osteo-periostitis. The pain may occur only periodically at certain times of the day. The attack may be ushered in by a chill, followed by high fever.

In the *chronic* form the inflammatory symptoms are far less pronounced, and the disease is more protracted and insidious in its course. There may be little or no febrile excitement, but little pain, and no protrusion of the eyeball until late in the course of the disease, unless the periostitis involves the orbital margin. Here the œdematous swelling of the surrounding parts, the decided thickening of the bone, and the presence of a hard, indistinctly fluctuating tumor, which is painful and sensitive, all aid in the diagnosis.

Caries and Necrosis.—The chronic form is often accompanied by the formation of a subperiosteal abscess, which sometimes strips up the periosteum from the bone for a long distance, and ends in caries and necrosis. This abscess tends to open at some point, usually through the conjunctiva or lid, by one or more sinuses; but the suppurative action may be very extensive, and open into the nose, the frontal sinus, the maxillary sinus, or into the cavity of the skull. If the abscess perforate through the conjunctiva, the seat of the bone lesion is almost certainly deep in the orbit, for if the margin of the bony orbit were involved the opening would be through the lid, in front of the tarso-orbital fascia. If the tendency of the suppuration is slight, the periosteum may become very much thickened, and small periosteal growths may be developed, which may ossify and form true exostoses. Pieces of loose bone very rarely come away, for, though the bones here may be thin, they are very hard. Moreover, the caries is almost always superficial. Sometimes the disease may begin as a real osteitis and involve the periosteum secondarily, and these are probably the worst cases, for the lesion is usually situated deep in the orbit. Several sinuses may form in the lids or surrounding structures, in different directions, and an ichorous discharge may last for an indefinite period, ending either in deeply retracted cicatrices or in eversion of the eyelids.

In all cases of caries it is safer and better to remove all pieces of loosened bone, even from the roof of the orbit, through a free opening, thus doing away with one source of cerebral irritation, and bringing about free drainage. If the ethmoid is involved, we should remove as much of the diseased bone as can be reached, and then introduce a drainage-tube through the nose. The same thing holds true of the lachrymal bone.

The varieties of chronic hyperplastic bone disease met with in the orbit are *periostosis*, *hyperostosis*, and *exostosis*.

Periostosis is a rare process in the orbit. It is probably a chronic periostitis which has ended in induration or sclerosis, forming a more or less circumscribed tumor along the orbital margin. It is a thickening of the periosteum, and, if circumscribed, the tumor might well be called a node.

Periostosis is always a late manifestation of syphilis, originating in the periosteum and usually confined to it. It is sensitive to pressure, and painful at certain periods of the day. It is probable that these nodes occur deep in the orbit, at or near the apex around the optic foramen, oftener than is usually supposed. It is probable that many cases of paralysis of the ocular muscles, coming on gradually, are due to a periosteal node pressing on the muscle or its nerve branch in its course or near its origin, producing at first paresis and then paralysis by direct pressure, as it grows. Such a node growing from the periosteum at the extreme bottom of the orbit, might readily involve the origins of all the straight muscles of the eye, and also the optic nerve, and produce blindness from atrophy of the

PLATE XXII.

Fig. 1.



Fig. 2.

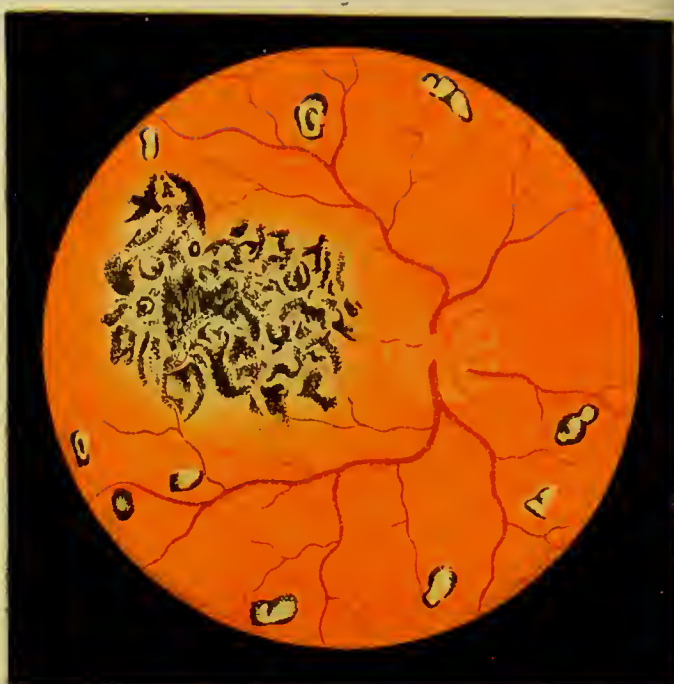


Fig. 3.



Fig. 4.



nerve. This form of periostitis involved in periostosis does not tend to spread, and hence is but little likely to involve the orbital tissue. Any projection of the eyeball, or exophthalmus, is due to the periostosis. Pressure of the eyeball backward causes pain, but the process may go on from the beginning without any pain, and the patient's attention may first be attracted by the exophthalmus, more or less impaired motility of the eye, then diplopia, and finally impairment of vision.

Hyperostosis due to syphilis is the rarest of all the affections of the bones of the orbit. It is a disease of the bone tissue itself and not of the periosteum. It may go on without any signs of inflammation, and may affect the entire thickness of the bone.

The excessive development of one or more of the bones of the orbit occasionally produces very singular changes in the shape of this cavity, and is always accompanied by exophthalmus. This hyperostosis is a hyperplasia of bone, and is to be distinguished from exostosis. It is of ivory hardness, and never yields to constitutional treatment. It is more often due to some other cause than syphilis. Any operation for its removal is only justifiable when its presence acts as a mechanical hindrance to the functions of the eyeball, and its removal is then best effected by the employment of the dentist's drill.

Exostoses of the orbit are outgrowths from the periosteum or bones toward the orbital cavity. They differ from the swelling and projection of periostosis in size and shape, and somewhat also in location. Though occurring in all parts of the orbit, they are more frequently met with on the inner wall and near the margin of the orbit than toward the apex of the orbit. They are smaller than a periostosis, with a narrower base, but project farther into the orbital cavity. They are always covered by periosteum, and frequently do not involve the subjacent bone at all. They occur more frequently than either periostosis or hyperostosis. They may develop in consequence of long-continued chronic periostitis, as direct outgrowths from beneath the periosteum. If they are situated deeply in the orbit, the most marked symptom is exophthalmus. The os planum of the ethmoid is a favorite seat of exostoses.

When they occur anteriorly and admit of digital examination, they are recognized as hard, smooth elevations, with circumscribed base, not usually painful on pressure, but generally causing pain by pressure on the eyeball, or on the nerves within the orbit. Though generally of slow growth and a late manifestation of constitutional syphilis, they may advance rapidly in size and be accompanied by signs of acute periostitis. The more deeply in the orbit these exostoses are situated the more apt are they to escape attention. When near the apex their pressure on the ciliary nerves or on the ophthalmic branch of the trifacial may cause deep seated pain, and excite suspicions of the presence of an intra-cranial tumor,

or periostitis, or even meningitis. If the pressure is so excessive or continuous as to interfere with the return circulation from the eyeball, the ophthalmoscope may reveal the presence of neuro-retinitis with choked disk, or an atrophic condition of the optic disk.

Treatment.—The treatment of these cases should always at first be constitutional, for these exostoses in the orbit sometimes disappear very rapidly under the combined use of mercurial and potassium iodide. It may, however, become advisable, and even necessary, to resort to operative interference for the removal of these orbital exostoses. Generally a pair of strong bone-forceps will suffice for their removal, as they usually have a narrow base, or pedicle; if the base be broad and thick, the chisel and gouge may become necessary.

EXPLANATION OF PLATE XXII.

Fig. 1, a well-marked example of choroiditis areolaris disseminata due to acquired syphilis. Most of these patches are grouped around the posterior pole of the eye, though some of them extend toward the periphery.

Fig. 2, an example of both varieties of choroiditis—choroiditis areolaris disseminata and choroiditis centralis. In addition to the scattered patches, there is a large irregular patch in the region of the macula lutea, which has reached the atrophic, pigmented stage. (From Juler's *Ophthalmic Science and Practice*.)

Fig. 3, a well-marked example of neuro-retinitis, with much oedematous infiltration of the optic disk and neighboring zone of the retina.

Fig. 4, an example of neuro-retinitis, with hæmorrhages mainly from the veins, which is not usual in syphilitic retinitis.

EXPLANATION OF PLATE XXIII.

Fig. 1, an example of "choked disk," or papillitis of the optic nerve, sometimes met with in syphilitic patients. The veins are seen enormously swollen and very much distorted, while the arteries are relatively very small and absolutely reduced in caliber. (From Loring's *Text-Book of Ophthalmoscopy*, vol. ii.)

Fig. 2, atrophy of the optic nerve. The disk is seen of a white or grayish-white color; the arteries are very much reduced in caliber, some of them being mere threads, while the veins are somewhat increased in diameter. An example of simple, non-inflammatory atrophy. (From Juler's *Ophthalmic Science and Practice*.)

Fig. 3, syphilitic retinitis. Through the atrophy of the epithelial layer, the fundus has acquired the appearance of a diffuse choroiditis, with marked changes in the pigment and stroma. The sketch at the bottom shows the development of flecks of pigment which differ from those of retinitis pigmentosa in not having the bone-corpuscle shape. (From Loring's *Text-Book of Ophthalmoscopy*, vol. ii.)

DISEASES OF THE EYE AND ITS APPENDAGES DUE TO INHERITED SYPHILIS.

BY CHARLES STEDMAN BULL, M.D.

I. CONJUNCTIVA AND EYELIDS.

THE poison of inherited syphilis does not seem to have any marked tendency to manifest itself either in the conjunctiva or eyelids, though patches of excoriation and actual loss of substance are occasionally met with in connection with similar manifestations on the face and scalp. The skin of the lids, as of the face, in syphilitic infants, is usually thick and opaque, and the ciliary margins of the lids often show little pits and scars, the signs of former eruptions.

We sometimes meet with well-marked instances of *tinea tarsi* or real marginal blepharo-adenitis of syphilitic origin. In these cases there are small patches of excoriation on the ciliary margin of the lid, with sharply defined edges, which extend a varying distance into the skin surface of the lids. These patches are irregular in shape, and are apt to occur near the canthi. They cause great irritation and soreness, the whole length of the ciliary margin of the lid being usually inflamed and swollen. They resist obstinately all local treatment, unless accompanied by appropriate specific constitutional medication.

Treatment.—The parts should be cleansed with warm bichloride solution (1 to 2,000), and all scabs or crusts removed twice a day. An application should then be made of an ointment of calomel (grs. v to \mathfrak{z} .j), or of the red precipitate of mercury (grs. viij to \mathfrak{z} .j). The patient's dietary should be carefully regulated, and small doses of calomel (gr. $\frac{1}{4}$ to gr. j) administered alone or with syr. ferri iodid. and cod-liver oil.

The chronic form of conjunctivitis with some thin muco-purulent discharge, so frequently seen in syphilitic infants, is probably not syphilitic in origin, but rather due to neglected purulent conjunctivitis, or to lack of cleanliness in the care of the child.

There is no authentic case on record of mucous patches or gummata occurring in infants with inherited syphilis.

II. LACHRYMAL APPARATUS.

The lachrymal apparatus does not seem to be affected by inherited syphilis, unless secondarily in consequence of extension from the lachrymal bone or other bones of the orbit and vicinity, or from the neighboring cavity of the nose. Caries and necrosis of the lachrymal bone or nasal bone, and even of the frontal bone in syphilitic infants, has been known to cause purulent dacryocystitis by reason of the proximity of the lachrymal sac and duct; but no case of primary disease of the lachrymal sac and duct, due to inherited syphilis, has been reported. The same may be said of the lachrymal gland.

III. SCLEROTIC AND CORNEA.

The *sclerotic* does not seem to be affected in inherited syphilis, except as an extension of disease from the cornea.

Our knowledge of the form of *corneal* inflammation, or *keratitis*, met with in children who are the subjects of inherited syphilis, we owe almost entirely to the observations of Mr. Jonathan Hutchinson, though this form of keratitis had long been recognized under the name of *scrofulous* or *strumous keratitis*.

Parenchymatous Keratitis.—Chronic interstitial, or parenchymatous keratitis, as it is now called, usually begins as a diffuse haziness near the center of the cornea of one eye, and at this stage there is no ulceration and little or no evidence of congestion. There is some complaint, however, of irritability of the eye, as well as of dimness of sight. Close examination shows that the haze or opacity consists of dots in the parenchyma of the cornea proper, and not on its anterior or posterior surface, and at first these punctate deposits are distinct from each other. In the course of a few weeks, or perhaps more rapidly, the whole cornea, except a narrow rim at the periphery, has become more or less densely opaque by the extension and confluence of these interstitial opacities. Still, however, there are parts more densely opaque than others. The appearance of the eye in this stage has given rise to the name "ground-glass cornea" (Plate XXI, Figs. 3 and 4). The cornea is now usually surrounded by a zone of ciliary injection, and there is more or less intolerance of light and pain around the orbit. After a varying period of weeks or months the other cornea is attacked, and the inflammation goes through the same stages, but rather more rapidly. The loss of vision may be so great that there is bare perception of light. This condition lasts a varying length of time, and then the first cornea begins to clear. In certain cases, however, after the ground-glass stage has passed, a yet more severe

one follows, in which the whole cornea becomes pink and even scarlet in color, from enormous development of vessels in the parenchyma; and here the crescentic fringes of blood-vessels are plainly visible at the periphery. Ulceration almost never occurs. The clearing up of the opacity is always excessively slow, but in the course of a year or more the improvement is decided. In the worst stage the surface of the cornea loses its smooth appearance and polish, reflects nothing clearly, and looks granular. Even in the most favorable cases the vision is never quite entirely regained. Almost all these patients present a peculiar physiognomy, consisting of a



Syphilitic Teeth (Hutchinson).

coarse, flabby skin, pits and scars in the face and forehead, scars of old fissures at the angles of the mouth, a sunken bridge to the nose, and a set of permanent teeth peculiar for their small size, bad color, and vertically notched edges of the central upper incisors. This crescentic-shaped notch in the cutting edge of the upper incisors is generally found associated with parenchymatous keratitis, though either may exist without the other. Where the two are met with in the same patient they may be regarded as pathognomonic of inherited syphilis. The keratitis may be accompanied or preceded by iritis, and is often followed by inflammatory and atrophic changes in the choroid.

A large proportion of the cases of interstitial keratitis occur in children between the ages of eight and fifteen years. It is comparatively rare in infancy and early childhood, and is very rare in adult life. Statistics show that girls are oftener affected than boys.

The general condition of these patients is sometimes very bad, and at others apparently good. They usually have a peculiar pallor of the face. When the permanent teeth are first cut they are generally short, and narrow at their edges. In the edge is a crescentic portion, thinner than the rest, which after a time breaks away, leaving a broad, shallow, vertical notch, which is permanent for some years, but eventually becomes obliterated by premature wearing down of the tooth.

Prognosis.—If a case of interstitial keratitis be seen early, and before any large part of the cornea has become opaque, a favorable opinion may be given. If intolerance of light is an early symptom, and is extreme, the opinion must be much more guarded. In proportion as the photophobia is slight, the prospect is favorable. The recovery in any

event will be very slow, and at best imperfect, which is due not only to the remains of some opacity, and the possible alteration in the shape of the cornea, but also to disease of the deeper tissues of the eye, notably the choroid and retina.

Treatment.—The dietary should be strictly regulated, and a rigid tonic treatment at once begun. A daily warm bath, followed by brisk rubbing with a coarse towel, and the inunction of cod-liver oil, from half an ounce to four ounces, according to the age of the patient, should be ordered. Iron in the form of the sirup of the iodide, with small doses of potassium iodide and tinct. nucis vom, should be prescribed. The cautious administration of mercurials should be begun, either externally in the form of ointment, or internally in the form of calomel. The latter must be very carefully watched, as these patients bear mercury badly. Locally, the eye should be bathed with hot water several times a day, atropine instilled, dark glasses should be worn, and, if the inflammation is acute, an occasional leech applied to the temple.

IV. UVEAL TRACT—IRIS, CILIARY BODY, AND CHORIOID.

I. IRITIS.

Inflammation of the iris in infants and young children, due to inherited syphilis, was first recognized and described by Lawrence in 1833. In the first edition of his *Treatise on Diseases of the Eye* he reports two cases. In one of these cases there were excoriations and ulcerations about the anus. The iris had lost its brilliancy and become dark-colored, was contracted and adherent, and the sclerotic was injected. In the second child, in addition to a general syphilitic eruption, both irides were affected, the iris being contracted and immovable, and the pupillary spaces opaque.

It is a rare symptom of inherited syphilis, and very often escapes notice mainly on account of the mildness of the symptoms. It is usually symmetrical, involving both eyes, but quite as frequently is confined to one eye. It appears to be more common in the female sex than in the male. It usually appears within the first six months of life. In a series of twenty-three cases published by Mr. Jonathan Hutchinson in 1863, the average age of the patients at the time of the beginning of the iritis was five and a half months. The oldest was sixteen months, and the youngest was six weeks. But cases have been reported in which the iritis had evidently commenced during the intra-uterine life of the fœtus, for at birth both irides have been found discolored and immovable, owing to adhesions to the capsule of the lens, and the pupillary space being more or less blocked by exudation. The effusion of plastic material is generally free,

and the danger of occlusion of the pupil is great. Iritis in infants is seldom complicated by either keratitis or chorioiditis, and is usually attended by very few of the more severe symptoms which characterize the disease in adults. The absence of the ciliary injection or sclerotic vascular zone, and the very slight local symptoms which iritis usually causes, together with the fact that young infants generally keep their eyes closed, will account for the frequency with which it may be overlooked.

Most of the children who suffer from syphilitic iritis are those born within a short period of the date of the primary disease in the parents.

Prognosis.—In cases of intra-uterine iritis the prognosis is very unfavorable, as it usually results in the development of cataract, and probably to extension of the disease to the chorioid and retina.

Where the disease occurs in infancy or early childhood, the prognosis is generally good, provided it is recognized. Slight discoloration and sluggishness of the iris should excite our suspicions, even though there be no ciliary injection, and the instillation of atropia will often reveal patches of pigment on the lens capsule, after the iris has been dilated. Even cases in which the pupillary space has been blocked by effusion of lymph yield to proper treatment in a comparatively brief space of time.

Treatment.—Mercurials are very efficacious in promoting absorption of the effused lymph and restoring mobility and color to the iris. Atropia in one half or even one quarter grain solutions should be instilled several times a day. The mercury may be administered either externally or internally. A warm bath daily and free action of the bowels will hasten the recovery. Young infants bear mercurials very well, and they may be given alone or in combination with ferruginous tonics and cod-liver oil.

II. CHOROIDITIS.

Doubtless many cases of chorioiditis in syphilitic infants and young children escape notice, on account of existing corneal complications or blocking of the pupillary space by exudation, thus preventing ophthalmoscopic examination.

But we occasionally meet with cases in which the cornea is clear and the pupil free, but in which disease of the deeper tissues of the eye exists. If the child is old enough, dimness of vision is complained of; and here the ophthalmoscope shows diffuse patches of exudation in the chorioid, in which the retina is also involved, and perhaps an exudation in the vitreous. If these cases are followed up carefully, the vitreous is seen to clear up under treatment, and then the chorioidal patches are seen better defined and more circumscribed. The changes are seldom limited to the chorioid, but involve the retina also. The chorioidal disease differs in no respect from the same disease met with in adults and due to acquired syphilis.

Prognosis.—The prognosis is not so favorable as in iritis. These cases recover more slowly, and probably never regain perfect acuity of vision, owing to more or less extensive disorganization of the outer layers of the retina.

Treatment is the same as that pursued in infantile iritis, but it is necessary to persist in this treatment for a longer period, and to depend largely on a general tonic and dietetic management of the case.

V. HYALITIS, OR INFLAMMATION OF THE VITREOUS HUMOR.

Inflammation of the vitreous humor, or pure hyalitis, never occurs alone as a distinct disease in inherited syphilis. The vitreous is apt to be involved in cases of inflammation of the choroid, and various kinds of opacities are met with. The most frequent are fine, dustlike opacities scattered throughout the vitreous; but we also occasionally meet with membranous opacities, both fixed and floating, which interfere greatly with vision, and are very slow in yielding to treatment. The fixed membranous opacities are probably never absorbed, and unless the fundus is fairly healthy they are not proper subjects for surgical interference.

VI. DISEASE OF THE LENS, OR CATARACT.

In neglected or unrecognized cases of infantile iritis, and in all cases of intra-uterine iritis, the lens tends to become more or less completely opaque. In the former class of cases the opacity of the lens follows slowly, and the development of the cataract may be postponed for several years. They are not at all good cases for surgical interference, owing to disease of the iritis, or choroid, or both, which coexist or have preceded the development of the cataract. Not much can be expected from discission or needling, and extraction of such opaque lenses is not to be recommended. Local applications and internal medication are of no use in promoting the absorption of such a cataract.

VII. RETINITIS AND OPTIC NEURITIS.

There are but few cases on record of retinitis or neuro-retinitis in children due to inherited syphilis. In chorioiditis the retina is almost certain to be involved in the process, owing to the intimate connection between the outer layer of the retina and the choroid; and the resulting defective vision is largely due to the disorganization of the layer of rods and cones of the retina by the exudation. Atrophy of the optic

nerve as a result of neuritis very probably does occur in the so-called malignant cases of infantile syphilis, but no such case has to my knowledge ever been reported. This is not strange, if we remember that, even in acquired syphilis, neuro-retinitis is relatively a rare constitutional symptom.

Hutchinson (*loc. cit.*, pp. 164 and 167), however, reports two cases of suspected inherited syphilis, in which the margins of the optic disks were not, as is usual in atrophy of the optic nerves, clearly defined, but were indistinct, and hence pointed to a previous stage of actual neuritis. The first case was a semi-idiotic boy of marked syphilitic physiognomy, who was quite blind. In both eyes the optic disks were ill-defined, very white, and with exceedingly minute vessels. The boy's teeth were typically malformed, and he was subsequently attacked by well-marked interstitial keratitis in both eyes. The second case occurred in a boy aged nine, of marked syphilitic physiognomy, with notched and narrow central upper incisors. The blindness had been advancing for some time before it was discovered. In both eyes the optic disk was flat, and bluish-white in color, and the vessels were of exceedingly small size. Only the trunks of the larger arteries and veins were visible, all the smaller ones having entirely disappeared. The margins of the optic disks were ill-defined and ragged.

These cases of atrophy, rare as they are in children, are quite sufficient to awaken our suspicions, and to induce us, when we meet with atrophic changes of the optic nerves in young persons, to make rigid investigations as to the possible existence of inherited syphilitic taint.

VIII. DISEASE OF THE MUSCLES OF THE EYE.

The little sufferers from inherited syphilis are very rarely subject to paralysis of any of the ocular muscles. It is, of course, probable that in iritis and chorioiditis the ciliary muscle should become more or less involved in the process, and the accommodation consequently more or less affected. But the extrinsic muscles of the eyeball, the four recti, and the two oblique, seem to be singularly exempt from paralysis, for we have no record of any such case in young children with other symptoms of inherited syphilis.

IX. DISEASE OF THE ORBITAL WALLS.

Periosteitis of the bones of the orbit, notably of the lachrymal and frontal bone, with or without caries, has been occasionally noted in infantile syphilis, and cases illustrating it have been published. The symptoms in no way differ from those of periosteitis and caries due to

acquired syphilis, but fortunately the disease in young children is much more rare. Any such disease of the bone might endanger the integrity of the eyeball through interference with the blood-supply to the eye and optic nerve, caused by infiltration of the surrounding tissues, or by infection of the lymph-channels of the eye by septic material coming from the general or localized suppuration. The prognosis is always unfavorable, and the treatment should be largely surgical, the diseased periosteum being freely incised, free drainage effected, and all dead bone at once removed.

SYPHILIS OF THE EAR.

By J. ORNE GREEN, M. D.

ACQUIRED.

THE manifestations of syphilis in the ear are so rare, or at least so often unrecognized, that the experience of any one practitioner offers but a very limited number of observations, and in the following article I have not hesitated to draw freely upon the literature of the subject, endeavoring to weigh the evidence offered, and to present the matter in as connected a form as our existing knowledge appears to justify.

Undoubtedly the disease escapes recognition in the ear more frequently than is supposed, for we are accustomed to confirm our diagnosis of the general disease by a physical examination of the whole body for other symptoms. It is, however, a fact now well established, that the grosser syphilitic lesions—gummata, papules, and condylomata—may appear on the external ear without there being any other manifestations of the disease anywhere on the body at the time; and if this is so, it is highly probable that some of the lesions of the deeper parts of the ear are also occasionally of syphilitic origin, but escape recognition, from the absence of any confirmatory symptoms in other parts. This is probably the case in some of the inflammations of the tympanum and of the temporal bone, and perhaps also of the labyrinth.

Frequency.—In regard to the frequency of syphilitic manifestations in the ear statistics have been published by Deprés, Ravogli, Buck, Schubert, and Ludewig. From these figures it is found that, out of 1,370 syphilitics, thirteen, or 0.95 per cent, showed syphilis of the external ear; also that, out of 7,515 patients suffering from ear-disease, eighty-three, or 1.10 per cent, were subjects also of syphilis; and of these eighty-three syphilitics the causal connection between the ear-disease and the syphilis was almost certain in forty, which gives a percentage of 0.53—i. e., taking these figures as a basis, 0.53 per cent of ear diseases are syphilitic.

I. SYPHILIS OF THE AURICLE.

Chancre.—Chancres of the auricle have been reported by several authors, and offer but little of interest: they were located on the posterior

aspect of the auricle, on the tragus, lobule, and mastoid process, and were attributed to kisses, bites, infection of a child by its nurse, etc.

The disease is certainly a rare one, for Mracek (*Wiener med. Presse*, No. 1, 1880), in a report of four hundred cases of chancres outside of the genital tract, gives but three of primary syphilis of the external ear. Gruber (*Wiener med. Presse*, Nos. 1, 2, and 6, 1870), who had as his field of observation the enormous material of Hebra's and Von Sigmund's clinics in Vienna, says he had never seen the primary lesion on the ear. Pellizzari (*Della trasmissione accidentale della sifilide*, Mailand, 1882) examined critically forty-one cases of syphilis without coitus, and found no cases of chancre of the ear, but he did find one chancroid of the lobule referred to infection from a towel which had previously been used by another person. Zucker (*Archives of Otology*, 1884, p. 245) describes one case which, however, he only saw in the healing stage. A man was kissed on the ear, but whether any abrasion existed at the time he was unable to state; four weeks after an excoriation appeared on the tragus, which steadily and gradually enlarged and suppurated. Eight weeks after infection, small, round, scaly efflorescences appeared on the hands; and one week later, when first seen by Zucker, the tragus was of a livid-red color, twice as thick as normal, and its anterior surface covered with a darkly pigmented, radiating cicatrix. The entire parotid region was much swollen, hard but not painful. Beneath the angle of the inferior maxillary was a bunch of separable but indurated and enlarged lymphatic glands. The meatus was nearly closed by swelling of its anterior wall, but without discharge; the deeper parts of the ear were normal in appearance and function. The lymphatics of the neck and axilla were swollen, but with the exception of the hands, as described above, no other symptoms of the disease could be found. A rapid cure followed a course of mercurial inunctions.

Hermet (*Maladies de l'oreille*, p. 258) describes two cases: one in a man, from a bite on the lobule given by a man who was then suffering from syphilis of the mouth; another in a woman, who, while she had an abrasion behind the ear, was kissed on the spot by her husband, who at the time had mucous patches on the lips. In the first case the syphilitic lesion developed twenty days after the receipt of the injury; in the last case it still existed three months after the kiss. Both were followed by constitutional syphilis, and both were accompanied by enormous ganglionic enlargements in the submaxillary and parotid regions.

Diagnosis.—Judging from the descriptions, the characteristic circumscribed induration of the primary lesion is not to be recognized when the disease occurs on the auricle, but we get a clean-cut ulceration, as though the tissues had been punched out, the base of a dirty-gray color, and accompanied by a great deal of inflammation of all the surrounding

tissues. In the cases reported, the lymphatic engorgement was in the submaxillary and parotid regions. From what we know of enlargement of the lymphatics, with other diseases of the ear of an inflammatory nature, it is probable that engorgement from disease of the tragus would appear first just in front of the tragus in the extreme upper parotid region, that from the lobule would show between the angle of the jaw and the mastoid tip, and that from the mastoid region directly over that bone and then just below it.

The disease, either simple or phagedenic, might be confounded with epithelioma of the auricle in certain stages of ulceration, but the one tends to self-cure while the other does not; and, in a very doubtful case, a microscopic examination of a portion of the growth would probably be sufficient to settle the differential diagnosis. The development of general constitutional symptoms would be another means of proving the diagnosis.

The treatment does not differ from that of the same lesion in other parts.

Eruptions.—The ordinary syphilitic eruptions of the skin may appear on the auricle. *Syphilis maculosa*, when it exists on other parts of the body, may appear on the auricle also, and is unimportant. *Syphilis papulosa* is rare on the surface of the auricle, probably on account of the paucity of glands on this portion of the ear, but it is seen occasionally in the concha, and in the posterior angle and on the edges of the lobule. The papules break down sometimes, leaving an ulcer.

Taylor (Rupp, Journal of Cutaneous and Genito-Urinary Diseases, October, 1891) asserts that papular syphilides may appear on the ears, diffuse themselves circumferentially, and produce reddish-brown patches which look like seborrhœic eczema or even psoriasis, this occurring within the first year of infection.

Tubercular syphilides of the auricle are described by Taylor, Burnett, Ravogli, and Sexton, and are of importance from their extent, their tendency to ulcerate, and the possibility of confounding them with other diseases. The most full description of them is given by Taylor (Rupp, *loc. cit.*) as follows: "There is a tubercular syphilide found on the ears which may at first be localized in spots or patches (papules or tubercles), but its lesions do not, as a rule, become sharply limited, and show a tendency to diffuse themselves on the surface. The whole thickness of the skin is involved, and these patches are reddish or brownish in color. In some instances they are scaly, and look like lupus exfoliativus, and in others, when subjected to irritation or in uncleanly persons, become inflamed and ulcerated, and in this condition a sero-purulent exudation occurs on their surfaces which may dry into crusts. In this condition I have seen this syphilide present a marked resemblance to eczema impetiginoso-

sum. This lesion runs a chronic course, and usually ends in atrophy or cicatrization. . . . This form may appear precociously in the first year, but by far more frequently in the second year or later."

Burnett (Treatise on the Ear, second edition, p. 222) describes a case which began as a circumscribed, infiltrated lump on the posterior aspect of the auricle. It was slightly elevated above the general surface, was of a deep reddish color, painless and without itching. In about six weeks the infiltration had diffused itself throughout the greater part of the auricle, which was thickened and deformed, and also extended over the mastoid. After some weeks of this condition, softening and ulceration ensued, with an offensive discharge, but without pain.

Sexton (Journal of Cutaneous and Venereal Diseases, June, 1883) reports three cases of tubercular syphilides of the auricle which he regards as a tertiary lesion, and, differing from other observers, thinks it is not liable to ulceration, but that the loss of substance, when it exists, is due to interstitial absorption. From his experience he thinks it is disposed to confine itself to the anterior portion of the pinna.

Ravogli (Second Otological Congress, Milan, 1880) reports a tubercular syphilide which began in the neck, ulcerated, and extended over the auricle into the meatus; the ulceration was deeply excavated and with everted edges.

Further evidence is necessary for us to decide upon the most common seat of the early disease.

Diagnosis.—A differential diagnosis in certain stages of the disease, when the aural lesion was the only one, might be attended with difficulties. Taylor, above quoted, calls attention to its occasional resemblance to impetiginous eczema. A failure of local treatment adapted to that disease and the success of a general constitutional course of medication might be necessary to settle a very doubtful case. In the ulcerated stage the distinction from epithelioma might not be easy. Epithelioma, when it becomes extensively ulcerated, is generally painful; this syphilide is not: the discharge from the former is thin, watery, scanty, and bloody; that of the latter is thick, purulent, abundant and offensive; the ulceration of epithelioma begins at a small spot and spreads peripherally; the tubercular syphilide is apt to break down over an extended surface or in several spots at once. Finally, we have the great test of our diagnosis in so many doubtful cases, the effect of general constitutional remedies. From lupus the disease could be distinguished by the discharge, which is almost wholly absent in lupus-ulceration, and by the absence of the characteristic cicatricial tissue of lupus.

The tubercular disease is apparently one of the later manifestations of syphilis, usually occurring in from one and a half to ten years after infection, and calls for iodide of potassium or that drug combined with mercury.

Antiseptic cleansing when there was discharge would be very necessary, especially so if the lesion was in the neighborhood of the meatus.

The papular and macular varieties belong to the earlier stages and require a general mercurial course without local treatment, except perhaps in the form simulating seborrhœic eezema, when some local applications might be necessary for the removal of the crusts.

Gummata.—Guminatous lesions occasionally appear on the auricle of the ear, and are found on both anterior and posterior surfaces of the cartilaginous portion, and also on the lobule. They may vary in size from a half pea to several times that dimension, are very apt to ulcerate, and the ulceration may extend deeply and involve the cartilage, even producing a necrosis of that tissue.

Rupp (*loc. cit.*) describes one case on the lobule of the ear in a patient who showed signs of the disease in the throat, anus, and faec. In order to prove the nature of the swelling, he cut into it, and found the reddish, fatty, glistening appearance of a gumma, without pus, steatomatous material, or marked fibrous surface.

I have myself seen a case recently in a man aged twenty-five, with well-marked squamous eruptions on the body, who within three weeks had noticed small lumps on the auricle, one of which, on the upper part of the concha, had become inflamed and ulcerated. When seen, there were two small, movable, rather soft tumors, size of half a pea, on the posterior surface of the auricle; they were not sensitive, and the tissue over them was perfectly normal. The whole integument of the concha was red, infiltrated, sensitive, and painful, and in the upper part was a round ulcer three sixteenths of an inch in diameter, clean cut, extending well into the corium, and covered with a dirty grayish deposit. The time of original infection could not be learned. The tumors and eruption disappeared within a week under iodide of potassium, and the ulceration cleaned off rapidly and healed.

A most interesting and instructive case is given by Hessler (*Archiv für Ohrenheilkunde*, xx, 242), of a man twenty-four years old, who for several weeks had noticed an ulcer on the anterior surface of the right auricle which would suppurate for a few days, then heal, then suppurate again. When seen, the whole auricle was bluish-red, swollen, shining, twice as thick as normal, and very sensitive. On the antihelix and concha was an ulcer three millimetres in extent, secreting a yellow adhesive serum, and the meatus was nearly closed by swelling of its walls. The history was one of ulcer on the penis and gonorrhœa, cured by internal and external medicines four years before, and no further symptom of syphilis had been noticed or could be found on the closest examination. Under cauterization the ulcer on the auricle partially healed, but in four months returned again larger than before. The skin was undermined, the carti-

lage became necrosed over a circumscribed area, and was excised and curetted. Partial healing took place, but the ulceration kept recurring, in spite of appropriate local surgical treatment. Nine months after the first appearance of the ear disease a small spot of periostitis of the tibia developed (the only symptoms of syphilis, except the ear disease, since the patient came under observation), and iodide of potassium was then given, under which the periostitis immediately disappeared, the ear began to heal, and in a few weeks was perfectly well, showing only a retracted and radiating cicatrix at the seat of the ulcer. It then appeared that the patient, two years before, had been treated for chronic swelling of the finger-joints by compress bandages without good result, and some time after that for a gummatous orchitis by iodide of potassium internally with excellent effect.

Diagnosis.—An extremely ulcerated gumma of the auricle might be confounded with an ulcerated epithelioma, but the slow development of the latter, generally months, and often several years, in contradistinction to the rapid growth of the former, would be a prominent characteristic, and in a very doubtful case general medication and a few weeks' time would settle the question.

The disease is undoubtedly one of the later tertiary manifestations, and iodide of potassium is apparently both rapid and effectual in relieving it. Internal medication seems all-sufficient for the cure, but care should be taken that the discharge does not enter the meatus and produce further irritation. For this discharge some cleansing applications should be used—baths of corrosive sublimate, or something similar—and in my own case calomel was dusted on the ulceration with apparently excellent effect.

Ulcers.—But one other form of the disease on the auricle remains to be mentioned. Several observers have reported small ulcers which are undoubtedly syphilitic. They appear singly on the anterior surface of the auricle, are usually of small size, with sharply defined edges and grayish bases, with very little discharge, and apparently with but little tendency to spread extensively; they are not painful, sensitive, or deep. Unless their syphilitic nature is recognized they are very difficult to heal, and may last for months in spite of cauterization and other local treatment. Under what category they should be placed I am not clear. They are found without the presence of either papular, tubercular, or gummatous syphilides in other parts of the skin, but, I think, may be ulcerations of a single nodule of one of these forms. The fact that they heal readily under iodide of potassium would seem to place them among the later symptoms.

Politzer (*Lehrbuch der Ohrenheilkunde*, ii, 691) reports two such cases: one occurring with otitis media suppurativa chronica, in a patient with syphilis of the larynx; and the other without any deeper ear disease.

Buch reports two cases: one with a syphilitic exanthem of the face and a syphilitic mucous membrane, three and a half years after infection; the other without any extra-aural manifestations. I have myself seen one case where I could find at the time no other syphilitic manifestations. All were readily cured by iodide of potassium internally.

Simple ulcers on the auricle are extremely rare—that is, well-defined ulcerations unattended by other disease of the skin, such as eczema, and their existence would lead to the suspicion of syphilis or epithelioma immediately.

II. SYPHILIS OF THE MEATUS.

One case of *chancre* of the meatus has been described, occurring just at the orifice of the passage; *maculæ* have been described by Urbantschitsch; and *papules* by both Gruber and Acton, the latter asserting that the papules may become so numerous as to close the passage (Rupp, *op. cit.*). None of these manifestations offer anything of special interest. Of course, they are possible, from the presence of skin in this situation, but they must be exceedingly rare not to have been mentioned more frequently.

Lacharière and McBride (Guide to the Study of Ear Diseases, p. 187) speak of an otitis externa diffusa due to syphilis where the walls of the meatus are somewhat swollen, although not so much so as in the phlegmonous form of the disease; the skin is cracked and red, and the discharge offensive. It is referred by them to the secondary stage of the general disease, and may affect one or both of the canals. Whether we are justified, from the imperfect evidence given, in adding an *otitis externa diffusa syphilitica* to our nomenclature, is very doubtful; and it seems more probable that the disease described by these authors is rather the dry papular syphilide mentioned by Taylor as sometimes simulating eczema which has become irritated in some way, perhaps by scratching, or else it is the beginning of condylomata.

Ulcers.—Syphilitic ulcers occasionally occur in the meatus; they have been described both in ears which were bathed in pus from old chronic suppuration of the tympanum and in ears free from any previous disease. Christinneck (Archiv für Ohrenheilkunde, xviii, 288) described one which occurred in a patient several years after infection, and in whom inunction cures had been used several times. There were pain, tenderness, and discharge in both ears, due to superficial, ring-shaped ulcerations, with dirty, whitish bases and thickened edges; these were situated at the junction of the cartilaginous and osseous meatuses. At the time there was ulceration of the nasal septum, with greatly enlarged lymph-glands in the neck and inguinal region, but no other symptoms of syphilis.

Constitutional treatment and painting the ulcers with argentis nitrate effected a cure in three weeks, leaving a ring-shaped cicatricial thickening of the canal.

Jacobsen (Archiv für Ohrenheilkunde, xix, 36) mentions a patient with suppuration of the right tympanum, of three years' duration, in whom there had recently appeared a ring-shaped ulceration at the entrance of the meatus; it had a dirty, grayish-white, adherent deposit, and its edges were greatly swollen. Six months earlier the patient had been infected with syphilis, and at the time of observation showed a syphilitic ulceration of the pharynx.

Skjelderup (Archiv für Ohrenheilkunde, ref., xxvii, 68) describes an oblong ulcer, size of a pea, in the left meatus, which was said to have followed a furuncle. A gradual increase in the ulceration followed a local treatment by mercurial salve and argentis nitrate, and the lymph-glands became infiltrated. As syphilis was denied, and no symptoms of it could be found elsewhere, a diagnosis of rodent ulcer was made, and the part excised with successful result; but three months later nasal and pharyngeal syphilis appeared, and was cured by general medication, rendering it probable that the aural ulceration was syphilitic.

Exostoses, pedunculated and broad-based, are very common in the meatus, and frequently come under the observation of all otologists. By many of the older writers, and by some of the later, they are referred to syphilis, but in my opinion they can not be regarded as manifestations of that disease. I have carefully investigated a great many of them, and have never found one that seemed to me to have a syphilitic origin; and in many of them any syphilitic taint could be denied most positively, both from the statements of the patients and from physical examination. The well-known tendency of syphilis to cause circumscribed periostitis was probably the origin of the theory. It certainly can be asserted that they present nothing pathognomonic of syphilis.

Condylomata.—No one form of syphilis of the ear appears to have been found as often as condylomata of the meatus; they are mentioned by many writers. Of 1,200 syphilitics examined by Deprés (Annales des maladies de l'oreille, 1878, p. 311), 980 showed flat condylomata on different parts of the body, and, of these 980, five showed them in the meatus. Kipp, in 16,000 ear patients, saw condylomata of the meatus in two. In 3,976 ear-patients, Buck found five with condylomata of the ear-passage. I am unable to give actual figures from my own experience, but I have seen them in several cases—perhaps five or six. Rupp (*op. cit.*) found the disease three times in over 4,000 cases of ear disease. They seem to be more frequent in females than males.

The best description of them is given by Stöhr (Archiv für Ohrenheilkunde, v, 130) from a study of fourteen cases in the hospital at Würz-

burg. They are most common in the narrowest part of the meatus, and generally appear with the earlier syphilitic manifestations simultaneously with macular and papular eruptions, beginning with a slight swelling of a dirty, bluish-red color, somewhat dotted with desquamation. This swelling and redness increase, a purulent secretion mixes with the cerumen, the spots of deepest red become more pronounced, and from infiltration rise above the surface, making the meatus narrower. A sense of fullness and slight tenderness on pressure is now felt. As the swelling increases the drum membrane may be involved, becoming reddish and dotted with loose epidermis, the dividing line between the drum membrane and the meatus is obliterated, and all the appearances now are those of an otitis externa diffusa. In a few days, with constantly increasing purulent secretion, the condylomata become fully developed, completely closing the meatus, which becomes very red from the corrosive secretion, and excoriated in spots from maceration of the epidermis. The growths assume various forms, sometimes conical, sometimes ragged, according to the mechanical pressure exerted upon them by the contact of the swollen walls.

They show a great tendency to ulceration, greater than in any part of the body except perhaps the genital region, and are often quite deeply excavated; they appear at first as hard papules covered with a white, finely granular, thickened epidermis, which, however, soon desquamates, leaving an exposed corium, either bleeding or crusted; they vary in size from a pin's head to a pea. In exceptional cases they develop without the formation of any purulent secretion, and remain dry.

The condylomata may now undergo an involution and gradually disappear, and the ulceration, if any existed, heal, leaving the meatus smooth, with a loss of the follicular glands and hairs, and showing scars of the ulcerations. Sometimes the cartilaginous meatus is permanently enlarged from the pressure of the growths, and those growths which have not ulcerated leave a pigmented spot for a long time.

The pain is at first inconsiderable, but, as the meatus becomes closed, there is a feeling of fullness, tension, and increased pain, which sometimes becomes very severe; the course of the disease resembles that of otitis externa diffusa, with difficulty of moving the jaw, pain in the head and neck, and occasionally moderate fever. In most cases the disease is unilateral. Deafness is usually due merely to the mechanical closure of the meatus, but occasionally the drum membrane becomes much inflamed, and may even suppurate.

One of the possible results of the disease is permanent contraction of the osseous meatus, due to an organization of the diffuse cellular infiltration of the corium, which always accompanies condylomata; this contraction is generally annular.

Diagnosis.—To distinguish condylomata from the exuberant inflammatory granulations which sometimes result from simple otitis externa, is by no means easy, and sometimes can only be done by the recognition of syphilis on other parts of the body.

Prognosis.—The prognosis is favorable and the cure rapid if the case is seen early; but the relief is slow, sometimes several months, if the condylomata have existed for some weeks, so that marked histological changes have taken place.

Treatment.—The treatment of maculæ and papules requires only the constitutional remedies of early syphilis—mercurial inunctions; the ulcers seem to belong to the later secondary stages, and a mercurial or mixed treatment is indicated, with cauterization of the affected spot by argenti nitrate. In addition to this, I think a moderate local pressure by a pledget of cotton soaked in carbolic oil, or some similar antiseptic oil, will assist absorption of the infiltration, and tend to diminish the annular contraction of the meatus so apt to ensue.

For the condylomata a general antisyphilitic treatment is, of course, of the first importance; but, in addition to this, if the condylomata are of the moist variety, cleanliness, by syringing or douching, is absolutely necessary. In the slighter cases this is sufficient for a cure. If, however, the growths are large, with pain and deafness, local treatment is also advisable. If the growths project very decidedly, parts or the whole may sometimes be snipped off with small scissors, and the remainder often then undergoes rapid involution. Cauterization with argenti nitrate can be used with good effect, the deeper growths being destroyed piecemeal by a bead of the caustic fused on the end of a probe; but, of course, care must be taken not to touch the drum membrane, and the cauterization should not be applied deep enough to give a violent reaction, which will increase the swelling and pain. Pressure will assist the involution, and a conical pledget dipped in dry calomel may be inserted into the meatus and worn for from three to six hours a day and then removed, and replaced the next day. Whatever method is employed, the most careful cleanliness, by syringing or douching, is requisite, a warm (105° Fahr.) solution of corrosive sublimate (1 to 5,000) being used three to six times a day, according to the amount of the discharge, and the ear afterward dried, and powdered with calomel. One possible risk following both excision and cauterization of the growths is adhesion of the raw surfaces thus made; this is very likely to occur if the walls of the meatus are so swollen as to lie in contact, unless prevented by the insertion of a cotton pledget or strip of gauze.

III. SYPHILIS OF THE MEMBRANA TYMPANI.

Eruptions.—The appearance of syphilitic cutaneous eruptions on the drum membrane has been reported in a few instances. Gruber (*Wiener med. Presse*, 1870, Nos. 1, 3, and 6) reports having seen papules there, which by ulceration produced perforations of the membranes, the disease simulating a simple myringitis. Langé (quoted by Kaposi on Syphilis, 1891) describes a formation like a papule on an inflamed drum membrane in a woman, who showed other symptoms of early syphilis at the time; it was located on the upper segment of the membrane. The small cell infiltration, which often surrounds the seat of a recent perforation in an inflamed drum membrane (the so-called nipple), could be so readily mistaken for a syphilitic papule that one hesitates to accept the imperfect evidence offered by this latter case.

Gummata.—Barratoux (*Bulletin et Mémoires de la Société d'Otolg.*, vol. ii, p. 2) saw in a woman five small gummata on the cheek just in front of the ear, a sixth over the mastoid, three others in the concha and outer meatus, while on the posterior lower quadrant of the drum membrane was a small projecting opalescent tumor, which he considered another gumma. In a few days this ulcerated at its apex.

IV. SYPHILIS OF THE TYMPANUM.

In approaching the subject of syphilis of the tympanum one feels that he is opening a field full of suspicions, but in which very little can be said to be proven by accurate pathological investigations. The diseases of the tympanum are almost all diseases of the mucous membrane, of the periosteum, or of the bone, and for all these structures syphilis may be said to have a special affinity. In practice we find all the common diseases of the tympanum occurring in syphilitic subjects, but as yet have no certain means of differentiating between the syphilitic and non-syphilitic ones, either by the subjective or objective symptoms; and the diagnosis of syphilis of the tympanum often rests on the good results of a general syphilitic medication in curing a disease which had previously proved intractable under a local treatment usually, in simple cases, effective; but even this proof is often imperfect, for general medication may cure the specific lesion in the pharynx which had produced a nonspecific tympanic inflammation, and the cause of the tympanic inflammation being thus removed, recovery from the aural lesion ensues.

The intimate relation of the Eustachian tube to the naso-pharynx would theoretically expose the tympanum to participation in the syphilitic diseases of the naso-pharyngeal mucous membrane; and in practice

we actually find, with these naso-pharyngeal manifestations, all three of the forms of tympanic inflammation, viz., otitis catarrhalis *secernens*, otitis catarrhalis *adhæsiva*, and otitis media *suppurativa*. They are undoubtedly produced by the naso-pharyngeal disease; but whether the tympanic disease is in all cases actually syphilitic, can not be stated till the specific microbe of syphilis has been discovered and its presence demonstrated in the tympanic structures.

The proved syphilitic diseases in the naso-pharynx of importance to our subject are :

Ulcerations of the mucous membrane, which occur at the pharyngeal orifice of the Eustachian tube and are accompanied by swelling which closes the tube, and in healing cause enlargement of the orifice of the tube by cicatricial contraction of one of its edges, or close it permanently by cicatricial union of both of its edges (Schwartz, *Pathol. Anatomie des Gehörorgans*; Steinbrügge, *Pathol. Anatomie des Gehörorgans*, Berlin, 1891; Loewenberg, *Archiv für Ohrenheilkunde*, ii, 119).

Sharp condylomata at the orifice of the tube, accompanied by swelling of the tissues, so as to close it (Schwartz).

In addition to these two distinct causes of catarrhal inflammation, Steinbrügge and Moos have found fatty degeneration of the tubal cartilages in a subject of tertiary syphilis.

We know clinically that, accompanying the early syphilitic ulcerations of the pharynx, the mucous membrane of the whole naso-pharynx is often inflamed throughout its whole surface, and secreting a thick, mucopurulent matter very freely. In addition to this, I am convinced we meet clinically with a syphilitic naso-pharyngeal catarrh without ulcerations or new growths. This form has, in my experience, been one of the latest of the secondary manifestations. The mucous membrane of the pharynx and naso-pharynx is of a general deep-red color, œdematous, with all its little folds and irregularities obliterated, and it gives the impression of a membrane deeply infiltrated with cellular growth. It is wholly destitute of ulcerations or prominences.

Of pathological changes in the tympanum itself during syphilis, the existence of secretory catarrh and purulent inflammation with caries and other complications, has been demonstrated by dissections by Schwartz (*Archiv für Ohrenheilkunde*, iv, 252), Von Troeltsch (*Virchow's Archiv*, xvii, 19), Betz, and others. Adhesive catarrh has been found by Toynbee (*Catalogue of Museum, Royal College of Surgeons, London*, No. 512), Schwartz, and Moos (*Virchow's Archiv*, lxi, p. 313), and the prominent lesion in this disease was ankylosis of the stapes, probably referable to a circumscribed periostitis, as Schwartz has suggested.

Otitis Catarrhalis Secernens, secretory catarrh of the tympanum, is not very uncommon in syphilis. It does not differ essentially from the

same disease in healthy persons, so far as the symptoms are concerned, but is rebellious to local treatment alone. It accompanies and is probably produced by the extensive inflammation of the naso-pharynx which is present with the earlier throat symptoms of the general disease. Its chief features are swelling and closure of the Eustachian tube, râles on inflation, slight congestion of the tympanum, and serous or muco-serous tympanic secretion, with deafness somewhat variable in degree and more or less subjective noise.

Treatment.—The ordinary local treatment to the naso-pharynx and ear may produce improvement, but a relapse follows almost immediately, and only when the naso-pharynx has fully recovered under the use of mercury can the ear get well. After the cure of the naso-pharynx the usual local treatment is of service, and sometimes absolutely necessary, to produce absorption of the tympanic secretion, to fully open and clear the Eustachian tube, and to get a full restitution of the tympanic mucous membrane to the delicate condition necessary for perfect mobility of the conducting mechanism.

I have occasionally seen another form of the same disease accompanying what I have spoken of above as the deeply infiltrated mucous membrane of the naso-pharynx. In this variety the secretion both in the naso-pharynx and in the Eustachian tube is very small in quantity, the Eustachian tube obstructed only slightly, the drum membrane much retracted and not returning to its proper position even after strong inflation or after the Eustachian tube is fully opened; the drum membrane itself is often slightly opaque and perhaps a little congested, but no râles are to be heard either in the tympanum or tube. Local treatment will readily remove the slight obstruction of the Eustachian tube so that the air will enter by Valsalva's inflation, but no improvement in the hearing or in the position of the drum membrane will be perceived till the infiltration in both ear and naso-pharynx has disappeared, and this will only take place slowly under constitutional treatment. The disease is, I think, almost wholly a cellular infiltration of the whole mucous membrane of the parts involved—is one of the later secondary manifestations, and best combated by a mixed constitutional treatment under which I have seen perfect recoveries. I have never been able to prove its true pathology, and can only judge of it from its clinical aspects.

Otitis Media Suppurativa.—Suppurative inflammation of the middle ear occurs in syphilitic subjects as the direct result of the syphilitic manifestations in the naso-pharynx, and also from other than syphilitic causes, but in either case the syphilitic dyscrasia is an important and serious complication. What rôle the specific germ plays can not be stated, but, judging from clinical experience, it is in this disease an important one. There are, however, no symptoms by which we can distinguish a

syphilitic from a non-syphilitic suppuration of the tympanum, although we can suspect syphilis when the aural disease develops during the existence of active syphilitic inflammations of the naso-pharynx. The dangers of extensive ulceration and affections of the bone are much increased in a syphilitic subject.

Treatment.—In this disease, more than in any of the aural affections yet spoken of, local treatment is of as much importance as antisyphilitic medication. Antiseptic cleansing is the important factor, and should be carried out in the methods fully described in the text-books on otology. If this is not done, the maceration of the surrounding tissues by the escaping pus predisposes to the development of eondylomata and ulcerations of the meatus, and any closure of that passage, by interfering with drainage, still further endangers the ear and life of the patient. It is impossible in this place to take up all the details of this necessary local treatment. It can only be undertaken by one thoroughly familiar with the use of the otoscope, and with manipulations within the ear and nose. Tympanic suppuration is a serious disease in itself, subject to many and dangerous complications, and the risks are vastly increased when it is complicated by syphilis. This is especially the case when the bone becomes involved; and a mastoiditis in a syphilitic subject is, in my experience, a reason for a most doubtful prognosis.

Internal medication should be adapted to the actual stage of the syphilis, if this can be made out. I think most cases occur during the earlier manifestations, when mercury is indicated; but I have seen it also in one case in the very late stages when there was syphilis of the internal organs. This was a young man with a syphilitic history of many years, and with an enormous enlargement of the liver, presumably syphilitic; the ear disease began as an otitis catarrhalis serena with serous effusion in the tympanum, without pain and without discoverable disease of the naso-pharynx; this became purulent, and after some weeks developed a mastoiditis with caries, from which he died, apparently from exhaustion. Whatever internal medication is used, the exhausting nature of the tympanic suppuration should be borne in mind, and may require a more tonic and stimulating course of treatment than would otherwise be used.

Otitis Catarrhalis Adhæsiva.—Hyperplastic catarrh of the tympanum is essentially an organization of a fine-cell infiltration of the tissues of the mucous membrane, and I think it can be said that in syphilis there is a strong predisposition to this form of aural disease. It is seen as the secondary result of either of the two preceding inflammations, the mucous membrane covering the conducting mechanism being very much thickened; and it is also found without being preceded by either of these secretory forms of inflammation, coming on insidiously, exactly as the

disease does in non-syphilitic subjects, but in syphilitics increasing rapidly and reaching a high degree of deafness. It may be accompanied by involvement of the labyrinth, as shown by diminished bone conduction, or may be entirely tympanic, the labyrinth being normal.

A fine-cell infiltration of the tissues is certainly one of the characteristics of syphilitic disease in many tissues; and when we find a progressive tympanic deafness, with all the symptoms of otitis catarrhalis adhæsiva, as usually seen, coming on in a syphilitic person, but the disease running a much more rapid and vicious course than usual, we are justified in assuming that this cellular infiltration from the general disease is the cause.

A low chronic form of periostitis of the tympanum (Schwartz) probably explains the pathological process, and corresponds with the results of Moos's microscopic investigations.

The few cases of the insidious form of the disease which I have seen have, I think, been in the later stages of syphilis; but the secondary variety following the distinctly secretory affections of the tympanum have developed very soon after the primary tympanic disease, which, as has been said, is often in the earlier stages of syphilis.

Of all the tympanic diseases which have been spoken of this adhesive form is the least amenable to treatment, both local and general. The prognosis for the hearing is very bad; the disease, once established, is likely to go on from bad to worse till useful hearing is lost. The secondary variety offers more hope than the insidious, and the possibility of this adhesive form resulting from either of the other tympanic inflammations should lead to the most thorough treatment, both local and general, of these primary tympanic diseases.

For the various forms of local treatment, reference must again be made to the text-books on the ear. Constitutional treatment adapted to the stage of the general disease should at the same time be pushed energetically.

Neuroses of the Tympanum.—Pain, referred by the patient to the tympanum, without the existence of any signs of congestion, deafness, or subjective noises, is occasionally met with in syphilitics. It occurs with syphilitic ulcerations of the pharynx and larynx, and may be constant, or only produced by the act of swallowing; it is sometimes very severe, and may be the one prominent symptom.

It is probably a reflex neuralgia of the ramus auricularis vagi. It certainly may occur from ulcerations of the epiglottis, probably also from ulcerations of either of the ary-epiglottic ligaments, and perhaps from ulcerations of other parts of the larynx and of the tonsils. The same pain is also sometimes met with in nonsyphilitic ulcerations of these same parts, noticeably in epithelioma. The absence of all signs of congestion

in the ear and of deafness, the hoarseness of voice, and the laryngoscopic appearances, give us the diagnosis readily.

The disease occurs in the later secondary or early tertiary stages of syphilis, and is only cured by the healing of the ulcerations by the administration of iodide of potassium. Morphine may be necessary to control the otalgia.

V. SYPHILIS OF THE LABYRINTH.

The anatomical changes in the labyrinth of syphilitics have been described by several writers, but the observations are as yet too few to allow any classification of the different varieties to be made from them alone. Minute dissections have been made by Toynbee (*Toynbee's Catalogue*, No. 512), Schwartze (*Archiv für Ohrenheilkunde*, iv, p. 266), Voltolini (*Virehow's Archiv*, vol. xviii), Moos (*Virehow's Archiv*, vol. lxi, pp. 314, 315); and Politzer (*Archiv für Ohrenheilkunde*, xvi, p. 303). These agree singularly in showing ankylosis of the stapes, often extreme in degree; thickening of the tissues of the membranous vestibule and semicircular canals from a fine-cell infiltration, with adhesion of these parts to the periosteum by connective-tissue bands; infiltration of the lamina spiralis membranacea and ossea and Corti's organ with large and small cells. In reading the minute description of the changes found in these cases one is struck by their periostitic character.

Clinical experience, however, has done more to elucidate the syphilitic diseases of the labyrinth than pathological anatomy, and probably most otologists see a considerable number of syphilitic ear diseases which they would agree are characterized by a series of symptoms referable to the labyrinth only. These symptoms are subjective noises of many kinds at once, and usually of a very high pitch, often described as small silver bells or steel rods, or as sudden and momentary elashings; attacks of vertigo, and occasional pain in the depth of the ear; the onset very rapid, usually in one night; the deafness sometimes slight at first, but rapidly increasing for both watch, voice, and tuning fork, but in other cases the deafness extreme almost from the beginning; the bone conduction diminished from the very beginning of the attack, so that the tuning fork on the forehead is heard loudest in the best ear. With these symptoms beginning suddenly there sometimes, but not always, follows, after an interval of days or weeks, a loss of perception of the higher notes, or, as Roosa (*Trans. First International Otolog. Congress*, 1876) has pointed out, these higher notes, when appreciated, are heard either false or doubled; this sometimes occurs when the hearing for the voice is but little affected. Physical examination wholly fails in these cases to discover any disease of the tympanum. Not only is this series of symptoms almost universally consid-

ered clinically to be labyrinthine, but an actual dissection by Moos (Virchow's Archiv, vol. lxix, p. 317) showed the anatomical changes already described above.

For the disease, when associated with the loss or false hearing of the higher notes, Roosa has given the name syphilitic cochlitis—inflammation of the cochlea—as that is the anatomical situation of the nerve-fibers which respond to musical notes. In many cases, however, we get the labyrinthine symptoms spoken of above without any symptoms pointing to the localization of the disease in the cochlea—that is, without the loss or falsifying of the high notes; and inasmuch as the dissections we now possess show not only involvement of the cochlea but also of the membranous vestibule and semicircular canals, and in some cases these latter much more diseased than the cochlea, a more general term than cochlitis seems necessary to express the whole pathological process, which can only be covered by syphilitic labyrinthitis.

In addition to this primary syphilitic labyrinthitis we may have the labyrinth involved secondarily from disease of the tympanum. Voltolini (Virchow's Archiv, xvii) reports the dissection of the ear of a person with secondary syphilis in which, with a secretory tympanic catarrh, hyperæmia of the membranous vestibule, the semicircular canals, and the lower end of the cochlea was found. Clinically, we occasionally see cases beginning as undoubted tympanic disease in which we get later the series of symptoms already spoken of as characteristic of labyrinthine disease.

The primary variety of syphilitic labyrinthitis seems to belong to the later secondary stages of the general disease, the earliest case which I can find coming on some six months after the initial lesion, and others as late as two years after it. When the labyrinthitis is secondary to a tympanic inflammation, however, it may appear much earlier, for, as has been said, some of the tympanic inflammations appear very early in the general disease.

Treatment.—No local treatment of the labyrinthitis is of use, and our whole reliance must be placed on general medication. The prognosis is always doubtful, for the structures of the labyrinth are so exquisitely delicate that a comparatively slight pathological process is apt to injure them permanently. It is, however, by no means hopeless if the case is taken early; and the development of the labyrinthitis should lead to a most energetic treatment by mercury, or by that drug combined with iodide of potassium. Politzer claims good effects in early syphilitic disease of the labyrinth by subcutaneous injections of pilocarpine, and I have seen good effects from this in some cases in diminishing the vertigo and subjective noises quite rapidly. The pilocarpine nitrate was given subcutaneously, beginning, in an adult, with a tenth of a grain, and increasing the dose to one sixth or one fifth of a grain till free perspiration and moderate sali-

vation were produced. This was repeated daily, or every second or third day, according to the strength of the patient, up to ten or twelve injections. The treatment is debilitating, and must not be carried too far. At the same time a mercurial or mixed treatment was also followed.

VI. CONGENITAL SYPHILIS OF THE EXTERNAL OUTER AND MIDDLE EAR.

But little has been written on the manifestations of congenital syphilis in the external and middle ear. My own experience is absolutely nothing. Notwithstanding this absence of reference to the subject, it is scarcely credible that the tympanum should escape becoming involved in the naso-pharyngeal affections of syphilitic children, and one would expect, and, I have no doubt, would meet with otitis catarrhalis seceruens and otitis media suppurativa in a very considerable proportion of syphilitic infants, accompanied by the very serious results of those diseases when they occur in broken-down constitutions. In a paper read at the International Medical Congress in Washington, in 1887, Barratoux gave as the result of the dissection of forty-three syphilitic infants—tympanic disease in twenty-seven, labyrinthine disease in four, and both tympanic and labyrinthine disease in twelve. As the paper was devoted to the labyrinth, no details are given of the condition of the tympana, and the statistics are quoted here merely in support of the supposition that tympanic disease is more common than would be supposed from the little that has been written upon it.

Occasional reference is made in the literature of this subject to syphilitic caries, resulting from or accompanying tympanic inflammations, and, although the true syphilitic character of the caries can not be said to be proved, it is highly probable.

The treatment of these tympanic diseases of congenital syphilis would not differ from that of the same diseases in acquired syphilis.

VII. CONGENITAL SYPHILIS OF THE LABYRINTH.

Deafness, as one of the prominent symptoms of congenital syphilis, has been long recognized clinically. Hinton (*Questions of Aural Surgery*) describes it; Hutchinson (*A Clinical Memoir of Certain Diseases of the Eye and Ear consequent on Inherited Syphilis*, London, 1863) makes it one of his triad of symptoms with keratitis interstitialis and notched incisors; Fournier distinguishes it as "*surdité profonde*," in contradistinction to the secretory tympanic affections accompanying syphilis of the naso-pharynx. It is generally acknowledged that congenital syphilis is the cause of a considerable number of cases of deaf-mutism, and the

clinical evidence always places the seat of the pathological changes in the labyrinth.

Comparatively few thorough dissections are at command, but these seem to show the same general changes in the labyrinth which have been already described in speaking of the labyrinthine diseases of acquired syphilis: periostitis of the walls of the vestibule, of the semicircular canals, of the canalis spiralis, and of the cochlea; collections of round cells in the membranous labyrinth, changes in the auditory nerve, and supplantation of the endolymph by a sero-bloody fluid (Barratoux, International Medical Congress, Washington, 1887). Gradenigo (*Archiv für Ohrenheilkunde*, xxv, 237), in an exhaustive article based upon reported cases and his own dissections, says that the affection begins with an extensive small-cell infiltration throughout the greater part or the whole of the membranous labyrinth, and this is accompanied by a rapidly increasing and often total deafness within a few days. The second phase of the disease, continuing for a long time, is a partial hyperplasia of the connective tissue, and beginning necrosis of the labyrinthine tissues. In the third or last phase, the newly formed connective tissue shrinks and assumes the character of cicatricial fibrous tissue, or is partially changed into bone. This labyrinthitis offers two peculiarities: a very rapid onset and a very slow subsequent course; the patient in a few days becomes almost or totally deaf, and for months or years after is subject to symptoms of an irritative nature, marking the slow progress of the disease. In exceptional cases this labyrinthine disease is followed, after a long time, by inflammation and suppuration of the tympanum with otorrhoea, but what relation this bears to the original labyrinthine periostitis is not clear. Certainly the dissections of the labyrinth we now possess do not seem to show a suppuration of that cavity, the changes being solely of a hyperplastic character, and we are not justified, therefore, in assuming a rupture of pus from the labyrinth into the tympanum.

This labyrinthitis syphilitica may be found at any age from infancy up to twenty years, and perhaps later; it begins, without warning, with continuous subjective noises, at first perhaps a low-pitched roaring, but soon passing into high-pitched musical sounds of small bells, steel rods, or machinery. Deafness is noticed almost from the beginning and rapidly increases—sometimes so rapidly that nearly total deafness will be described as having come on in one night. All local and general symptoms of reaction are wanting, except that sometimes in young children a slight fever is noticed for a few days only; there are no fever, headache, paræsthesias, or vomiting. The perception of high tones is usually lost early. A certain amount of vertigo and disturbances of equilibrium are noticed, usually early in the disease, but sometimes only after several months; they are rarely, however, of a severe character. In case the hearing is not abso-

Intely lost in the beginning, it either fails gradually or is subject to sudden diminutions; and Gradenigo states that, if keratitis exists at the same time, these sudden losses in the hearing are accompanied by increase in the keratitis. In the end, usually all acoustic perception is lost. Inspection of the ear in the early stages shows nothing abnormal; later, the drum membrane may appear opaque and hyperæmie. As a rule, first one ear is attacked and then the other. The disease occurring in a child under six years of age produces deaf-mutism.

Treatment.—Only in the very earliest stage of the labyrinthitis is treatment at all likely to be of use, and even then the chances are very much against success. Unfortunately, with the absence of pain and other alarming symptoms the patient usually fails to appreciate the serious nature of the disease, and is only seen when the disease has already passed its first phase. The indications in the earliest stage of the disease require both an antiphlogistic and antisyphilitic treatment: for the first, leeches over the mastoid and at the orifice of the meatus, according to the strength of the patient, with purgatives, preferably of calomel; for the latter, inunctions and iodide of potassium, or some other form of mixed treatment. Later in the disease the antiphlogistic indication does not exist, and the specific constitutional treatment alone is of use, and may be supplemented or alternated by subcutaneous injections of pilocarpine nitrate (for an adult, one eighth to one sixth grain every other day). The treatment should be followed out for months. Often, in spite of all treatment and notwithstanding occasional improvement, total deafness finally results, but sometimes a modicum of hearing is retained.

HEREDITARY SYPHILIS.

By F. R. STURGIS, M. D.

Definition.—Hereditary syphilis may be divided into the two varieties of congenital and hereditary, the difference being that in the former instance the symptoms are present at birth, in the latter they appear a longer or shorter time afterward. Some writers have considered that there is another variety which they designate as late hereditary syphilis (*syphilis hereditaria tarda*), in which the symptoms are entirely absent during the earlier period of the child's existence, making their appearance only when the age of puberty is reached; but a careful examination of these cases renders it extremely doubtful whether this view is correct, inasmuch as it is extremely probable that some earlier symptoms have occurred which have escaped notice.

For the purposes of this paper, however, the definition congenital and hereditary syphilis given above may stand, although the former definition is, of course, included in the latter.

HISTORY.

Among the earlier writers on syphilis of the fifteenth and sixteenth centuries, although the existence of syphilis in newborn infants was recognized, its hereditary character seemed not to have been fully understood. Mathiolus (*Diday, Syphilis des Nouveau-Nés*), in 1536, was the first writer who mentioned the existence of syphilis in newborn infants, but it is questionable whether he is writing of the hereditary and not the acquired type, falling into the same error that Torella, who wrote in 1498, did when he spoke of the fact that in nursing children the first infection appears in the mouth or in the face, and that this occurs in consequence of infection from nursing. Nearly all subsequent writers down to the time of Paracelsus, in 1529, followed in very much the same track, ascribing syphilis rather to poisoning after birth than as a consequence of hereditary transmission. This latter writer was the first who asserted the reality of the hereditary form by stating that in certain cases the disease was hereditary, and transmitted from father to child. He appears, however, to have been alone in his view, for subsequent writers have perpetuated the old mistakes, except perhaps Nicholas Massa, in 1532, who stated that

he had seen three children, of the respective ages of three, six, and eleven years, affected with syphilis, and, as he considered that the disease could not have been contracted by either coitus or suckling, he concluded it was hereditary.

In 1553 Brassavola admitted three forms of transmission: First, where the child has been affected by actual contact; second, where it has been suckled by an infected nurse; and, third, where, being infected, it communicates the disease to its nurse. And thus it runs through subsequent writers, some of whom—as, for example, Augier Ferrier, in 1553, and Hascharidus, in 1554—seemed to have a glimmering of the truth, but none of whom was positive about it, ascribing the infection to various causes other than hereditary syphilis, until we reach the time of Fallopius, in 1555, who, after enumerating the various forms of contagion, among them that by the milk, says, “You will see small children born of infected women who suffer for the sins of their parents, and who are born in a semi-cooked condition.”

This would seem to indicate that Fallopius had some idea that the disease was conveyable to children by other than the acquired method; but no actual facts are given until Rondelet, in 1560, says, “I have seen a boy born whose body was entirely covered with the pustules of the morbus Gallicus.”

Thus we see that up to 1560, with the sole exception perhaps of Paracelsus, most writers upon syphilis have not been perfectly positive as to the existence of the hereditary type of syphilis in children.

It will not be necessary to go further into the historical question of the existence of hereditary syphilis, which has probably been coeval with the acquired form, whether we believe that the acquired form was first introduced into Europe by Columbus, or was generated at the siege of Naples, or existed before either of these two periods.

The next step that we shall consider will be the etiology of hereditary syphilis.

ETIOLOGY.

Infection by the father; the mother being reputed to be healthy, the children are syphilitic.

For a long time it has been a moot point whether syphilis could be conveyed to the child by the father without any infection of the mother, or whether it was necessary that the mother should be infected in order that the child should be diseased, no matter what the condition of the father might be at the time of the conception.

Up to 1854 the opinion was pretty generally accepted that the father, being alone syphilitic, could communicate the disease to the child without the infection of the mother. The cases which have been quoted in support of this theory are, however, so uncertain and so deficient in many

important details as to render their value as evidence upon this point of little worth; and it is hardly necessary, in a paper of this description, to quote case after case in support of a theory which I believe is gradually getting to be less and less accepted, particularly as those interested in this subject can study them by consulting the papers by the writer (*New York Medical Journal*, July, 1871, and July, 1873, *Archives of Pediatrics*, 1888, and *Hereditary Syphilis* published by Diday, translated by Mr. Whitley, and annotated by myself). There are two cases, however, which are worthy of extended notice and criticism, because they are so carefully and thoroughly reported by Dr. R. W. Taylor (*Archives of Clinical Surgery*, September, 1876):

Case No. 1.—On the 20th of September, 1870, a woman brought her infant to my office for treatment. At this interview I obtained from her, in the main, the following history, though some of the facts were elicited and others confirmed at a subsequent time: Her name was Mary F.; she was born in Ireland, twenty-five years of age, and had been married in March, 1861, nearly eleven years previously. She was a descendant of a perfectly healthy family noted for its longevity, and had brothers, sisters, and near of kin who were in perfect health. She had never suffered from sickness during youth or puberty, except certain slight ephemeral affections which left no morbid sequelæ. When married, therefore, she was healthy, robust, and strong. Her husband was then known to be a somewhat delicate man, aged twenty-two, but his wife said he was considered to be in average good health. Of his condition more will be said later.

In February, 1862, one year after marriage, the woman gave birth to a child at full term which was dead. It presented no perceptible lesions, and it was thought it had died a few days before birth, but no cause could be assigned for its death. During gestation the health of the mother was good, and she did not observe any skin trouble.

In February, 1863, she gave birth to another child, which lived until its sixth week and then died of wasting and exhaustion. During its life it was afflicted with condylomata of the anus, roseola, and a papular eruption which also invaded the palms of the hand and soles of the feet.

In June, 1864, she had another child, a boy, which died when five weeks old, having the same eruption and general conditions of the last ones.

In July, 1865, she had a girl which, having broken out with a general eruption similar to that of the others, died of marasmus when four weeks old.

In July, 1866, she gave birth to another girl, seemingly healthy, who when a month old became sick, weakly, and covered with an eruption. It lived three and a half months, and died of weakness (mother's expression). It is said to have had a senile look.

In 1867 (either in July or August) she became the mother of still another girl, which was at birth healthy, and has remained in that state without presenting any lesion which would cause a suspicion of her being syphilitic.

In August, 1870, not having been pregnant since the birth of the last girl, in 1867, she was delivered of an apparently healthy girl. Shortly after its birth this child became sick, and covered with an eruption.

During a very careful examination I satisfied myself that the child was the

victim of hereditary syphilis. Over the body and extremities was scattered a very copious roseolous syphilide, which in some regions had become of a deeper red or coppery tint. Interspersed among the patches of roseola were numerous typical syphilitic papules of the small, flat variety. These lesions were very copious on the hands and feet, with much scaling, resembling somewhat a palmar or plantar psoriasis, but rather more hyperæmic, while a few which were seated around the margin of the anus presented an excoriated, oozing surface, and similar lesions in the vulva were surrounded by patches of a deep red. There was an intense ozena, which rendered the child's breathing much labored and noisy, and from the nostrils a bloody sanies freely flowed. The face was otherwise studded with erythematous patches. The mouth was comparatively free, except certain minute excoriations on the dorsum of the tongue at its root. The nutrition of the child was profoundly affected. Under inunction treatment its health improved and its body became free from all blemishes.

Such is the history of this child which presented unmistakable syphilitic lesions. It was finally cured by proper treatment carefully followed.

I subjected the mother to a most rigid examination, and found upon her no evidence of syphilis, past or present. She had never had any lesions upon the genitals; there was no enlargement whatever of the external ganglia; she had never had a spot upon the body or the scalp. She was even free from acne papules. Her hair was abundant and of most luxuriant growth. She never had any ulceration of the mouth, tongue, or pharynx, nor had she at any time suffered from rheumatism. It so happened that my friend Dr. Weir had an opportunity of examining this woman, which he did with his usual care and thoroughness, and pronounced her perfectly free from syphilis, past or present. He fully agreed with me as to the syphilis of the child. In order to render my study certain, I followed this case for over two years, during which time she had a facial erysipelas, and, although I repeatedly examined her and interrogated her, I never saw a suspicious symptom nor elicited a suspicious fact. The child had not had any specific lesion in its mouth; hence it could not, if such an accident were possible, infect her.

When about six months old the child had a relapsing syphilide, which was cured by treatment. Two years after the birth of her last syphilitic child she brought forth another, a boy, who was and has remained perfectly healthy. This is the mother's history.

Now it is necessary to give that of the husband. He was infected with syphilis a year prior to his marriage, but under mercurial treatment of about six weeks' duration all visible manifestations of his disease had disappeared at the date of marriage. Shortly after he suffered severely from nocturnal pains, which he regarded as rheumatism.

He did not follow treatment regularly after this for some years, but at the onset of periosteal pains he often took large doses of the iodide of potassium, on the prescription of a comrade. In 1864 he had deep ulcers on the scalp and on the legs, which left characteristic cicatrices. Shortly after this he had scaling patches on the palms and on the soles, which disappeared while taking iodide. He neglected treatment again for more than a year, during which time he suffered from weakness and presented an unusual pallor. In 1866 he sought relief at a dispensary, and then followed a course of treatment which, with some difficulty, I learned was of the mixed kind—biniiodide of mercury and iodide of potassium—for nearly a year, when he became apparently well.

During this time his wife brought into the world a child which lived, and which never presented any signs of syphilis. He then gave up medicine, and did not take any for some years, when, in 1869 and 1870, he began to experience his pains again. During this time he impregnated his wife, and she bore the syphilitic child which she brought to me. Examined by me, I found a man of medium size, of good frame, thin and pale; all the ganglia of the body were still enlarged, though he was in the ninth year of syphilis. On the skin were a number of cicatrices. Urged by me, he again underwent mixed treatment for fully eight months, during which time his wife conceived and bore a child which was perfectly healthy, while he himself was restored to health. I was careful that the wife did not take any mercurial. I gave her iron and quinine.

Presented in brief, these facts are as follows: A man with early syphilis impregnates a healthy woman. She, showing no evidence of the disease, brings to the world first a dead child, probably syphilitic; then five undoubted syphilitic children. During this period the syphilis of the father is in an evidently active condition. Then, under treatment, he is seemingly free from his disease. His wife at this time bears a child who is free from syphilis, and remains so. His disease being uninfluenced by treatment, it again develops, its power of contagion returning, and then the wife becoming pregnant, has another intensely syphilitic child. Being again treated, and apparently cured, he again impregnates his wife, and she then bears a healthy child, which within a year shows no evidence of syphilis.

Case No. 2.—A healthy woman was married to a healthy man in 1862. In the three years following she gave birth to three children, upon whom she never saw any skin affections, and who, in short, were perfectly healthy. In 1866 she had a boy, who soon became sick, puny, and covered with a skin disease. The history of anal condylomata and ozena was clearly made out.

In the latter part of 1869 she had a girl, who soon became sick in the same manner as the boy.

When the child was four months old it was brought by its mother to the surgical clinic of Prof. Willard Parker. At this time it had a squamous, coppery eruption around the mouth, and a roseolous and papular eruption on the body and soles of the feet. It also presented a typical, senile facies. The mother also brought the boy just mentioned with her, he having interstitial keratitis, Hutchinson's teeth, and umbilical hernia. She desired treatment for the latter affection. The cases were placed under my care and treated with mercurials. These two children were undoubtedly syphilitic. The history of the older child was examined into carefully, and the fact of the appearance of secondary manifestations soon after birth was clearly made out. The mother was in blooming health, and the most careful examination failed to reveal any suspicion of being syphilitic. I may here repeat that from this time, for a period of seven years, until 1875, and though repeatedly examined, never could I find any evidence of syphilis. Indeed, I am firm in my opinion that she was not syphilitic, nor had she ever been.

In the early part of 1869 she had another girl, which she brought to me when two months old, covered with a roseola and having mucous patches in its mouth. There were, besides, two condylomata on the anus.

The vulva was eezematous. The child had begun to pine, and its skin was thin and dry. The mother was in excellent health, and, as I have said in my general remarks, presented no evidence of syphilis after this child's birth.

A few weeks after this consultation, which was in May, 1869, the husband came to me for treatment with a gummatous inflammation over the left eye-brow. His history was as follows: In 1865 he became syphilitic, having a chancre which destroyed part of the prepuce. This was soon followed by a general eruption on the scalp and upon the body. He also had much trouble with his throat. He was treated only for a period of six weeks, when he regarded himself as cured. From that time until my examination he had had slight evidence of his disease, and being a man of irregular and careless habits he did not apply for treatment. The lesions were scattered papules upon the body and also upon the elbows and knees.

It is probable that he would not have sought my advice but for the unsightly appearance of the eruption on the forehead, and pain experienced by the pressure of his hat. To be brief, he was kept under treatment by me, having impressed him with the necessity of it for several months.

In 1872 his wife gave birth to a child which I did not see until it was more than four months old. His mother was absent in a distant town at his birth, and remained there for some months. She said she never saw any indication of disease in this infant, and her mother pronounced it one of the healthiest children she had ever seen. I could not find any evidence of syphilis, past or present, and my belief is that it was not syphilitic. The mother was watchful and solicitous about the child, and her experience with three syphilitic children was such that her evidence of the child's perfect health may be received without question.

The further history of the woman is that, following a cold six years after the birth of the first syphilitic child, phthisis developed and she died within a year, never having developed any syphilitic lesion.

The facts pertinent to the present issue in the case are very simple and clear. Two parents have three healthy children. Then the father became syphilitic, and in the first year of his disease his wife gives birth to a syphilitic child.

His disease is moderately severe and not properly treated, and in three years again his wife bears a tainted child. During this period the wife is perfectly healthy. In 1869 she brought forth another syphilitic child, and with the exception of a slight anæmia, did not show any deviation from the normal standard of health. Again, in 1872, she had another healthy child.

Let us now look at the father's history. He was healthy until 1863, prior to which his wife had the three healthy children. In that year he became syphilitic and was only indifferently treated. Within a year his wife gave birth to the first syphilitic child. From that time for several years onward he had only mild evidences of syphilis, for which no treatment was followed. While he was thus in the power of the syphilitic diathesis, his wife bore a second syphilitic child in 1866. His being a case in which syphilis took firm root in his organism, that diathesis remained active.

Thus we find he shows slight evidences of the power, and his wife again, in 1869, brings into the world an unmistakably syphilitic child. Then, his disease having been influenced by treatment in about two years, his wife again bears a child without blemish.

Both of these cases are remarkable, not only for the thoroughness with which the infant's symptoms are detailed, but for the careful manner in which the history of both father and mother is given, and the

length of time in which both of them have been followed out since they first came under Dr. Taylor's care.

But now let us look at a few points with regard to both of these cases. In the first one, the mere fact that the woman, even after a most "rigid examination," shows no evidence of "syphilis, past or present," can not be admitted as evidence that the woman really did not have syphilis, when we call to mind the cases recorded by Keyes in his work on Venereal Diseases, which is referred to on page 612; by Giefsberg in the *Vierteljahresschrift für Dermatologie*, etc., for 1879, referred to on page 613; by Lewin, in the *Wiener Medizinische Presse* for 1876, referred to on page 613; and by Barthclemey in the *Annales de Dermatologie et de Syphiligraphie* for 1889, referred to on page 613, where women known to have been syphilitic, remained entirely free from syphilis, one for three years, the second for thirteen and a half, the third for seventeen (?), and the fourth for fourteen years, and yet continually gave birth to syphilitic children. The strong point in these cases of Taylor is that, when the father followed treatment the mother gave birth to perfectly healthy children, and when the father suspended his treatment the children again became diseased. This certainly would seem strong confirmatory proof of the fact that the father was the sole cause of the disease; but, on the other hand, it must be borne in mind that trustworthy observers have remarked that in cases where the child was born syphilitic, the father either manifesting signs of syphilis or admitting its previous existence, while the mother herself has never exhibited any symptoms of the disease, children have been born diseased when the father alone has been treated, but when the mother has been treated the child has been born healthy. In this connection allow me to quote a case from Mr. Langston Parker, taken from his book on *The Mercurial Vapor Bath*, page 43:

A young lady married with all the prospects of future happiness that fortune and apparent health could give. In due course the lady became pregnant, but miscarried. The same things happened in her second and third pregnancy. A good deal of mental uneasiness was produced, and some suspicions arose. The fourth child was born living, but at six weeks old had snuffling, and the eyes became bad; condylomata also appeared about the anus. A neighboring physician of great local eminence was consulted, who said rather abruptly, "The child is diseased." The parents, as may naturally be supposed, were shocked and horrified beyond measure, the father having, at a remote period before his marriage, been affected with syphilis, but the mother had never exhibited the least symptoms of the disease.

He was put upon a course of blue pill and iodide of potassium.

The mother at first was not treated. A fifth child was born, and at the end of the first month had symptoms of syphilis. The father was again only treated, and a sixth child was again born diseased. The mother was again examined, but no trace of the disease could be found in the throat, vagina, uterus, or elsewhere. The patients were now placed under my care. I recom-

mended that both should be treated by a full course of mercurial vapor, and that no intercourse should take place during that period. The seventh child was born healthy and has remained so, and neither father nor mother has as yet exhibited any further symptoms of the disease.

As regards the point of the woman bearing some children which were syphilitic and others which were not, it must be remembered that the syphilitic diathesis is not always active in the diseased person; periods occur in which the patient seems to be incapable of conveying syphilis. This is as true of women as of men. The explanation in Dr. Taylor's cases is simply that some of the children were born during this period of repose in the woman, and that the father's treatment probably had nothing to do with the immunity of the children.

There is one singular fact in these cases that, notwithstanding the evidently syphilitic symptoms in the children, the mothers are not infected, and it is to be regretted that Caspary's experiment, narrated on page 615, was not tried in these cases.

Another case is that of M. Fournier (*Die Vererbung der Syphilis im Vernehmen mit dem Verfasser. Bearbeitet von Dr. Ernest Finger, 1892*):

Fifteen years ago I met by chance an old college mate whom I had not seen for a long time. We talked of this and that, and my friend recounted his experiences and misfortunes. "I am all broken up," he said; "my wife has just had a fourth miscarriage after several months of pregnancy, and what puzzles me is, that all her miscarriages are produced without cause, injury, or imprudence on her part. So far as I can see, my wife is a large, strong, well-built, healthy woman; and in spite of this all I foresee, to my very great misfortune, that I am never to have any living children." The thought suddenly struck me, and I answered: "Perhaps your wife is not so much responsible as you are for these successive miscarriages. I remember many years ago, when we lived in the Quartier Latin, that you had a very fine pox, which it seemed to me you did not particularly take care of. If I were in your place I should treat myself—take mercury and the iodide of potassium." This piece of advice was given in the street, as we were walking; it was followed, and the specific treatment was taken at once and earnestly. Fifteen months later my friend's wife was brought to bed, at term, with a living child, of the age to-day of twelve years. Since that time she has had three other pregnancies, which terminated no less fortunately.

Unluckily, this case loses its value as proof, because, first, there is no proof that the woman was not syphilitic; and, second, there is no proof that the woman was not subjected to mercurial treatment by her husband.

Now let us look at the reverse of this picture. Let us examine those cases where the father is syphilitic and the mother really free from syphilis, and see what happens to the children.

In 1854, Cullerier the younger read a paper before the Société de Chirurgie de Paris upon the question of the paternal transmission of syphilis through the semen to the child, and, after giving many cases, he

stated as his opinion that such influence was negative. In other words, in order that the child should be syphilitic the mother must have been infected with syphilis at some period prior to the child's birth; and in his paper he gives several instances in which, while the father was undoubtedly syphilitic, the mother was apparently healthy, and the children were not only born healthy but remained healthy for several years after birth. This view was strenuously opposed by most syphilographers at the time, and it was not until 1860 that M. Notta, of Paris, read a paper upon the same subject, giving in detail eight cases where the fathers had syphilis, the mothers were exempt, and the children all escaped infection.

M. Charrier published (*Archives Générales de Médecine*, 1862) the history of four cases of paternal syphilis where neither the wives nor the children suffered. This was followed in 1867 by an essay by Mireur, of Paris, confirmatory of the views of Cullerier as to the nullity of the influence which the father's syphilis plays in producing syphilis in the offspring without a concomitant disease in the mother.

Oewre, of Christiania, gives the result of fifty-three fathers who are all syphilitic. They have among them ninety-seven children, none of whom show any signs of syphilis.

Dr. Parry, of Philadelphia, published two similar cases (*Philadelphia Medical Times*, 1872), and in 1873 M. Langlebert gives the history of two cases in which, notwithstanding marked paternal syphilis, the mother and children both escaped.

These cases would all tend to show that, notwithstanding the fact of the father's syphilitic condition, the children themselves escaped infection provided that the mother is also exempt from syphilis; in other words, that the semen is not capable of directly conveying the disease, as is proved by Mireur's experiments on inoculation of syphilitic semen.

Infection of the mother through the fœtus by conception.

This method of transmission was at one time invoked in order to explain those cases in which the child, evidently diseased, was either born of a mother who was free from all symptoms of syphilis, but who could not be inoculated by her child, or in those instances in which the mother showed some traces of syphilis after the birth of her child, but none preceding it.

As this question really hinges upon the point, already discussed, whether syphilis can be transmitted by the father alone, without the participation of the mother in the infection, I shall not dwell longer upon this point, but shall pass to the consideration of the next subject.

Cases where the father is diseased, the mother apparently healthy, children diseased, and yet, from previous knowledge of the mother, it is evident that she has been syphilitic before, although showing no evidences of the disease.

The first case is taken from Keyes's work, *Venereal Diseases*, and runs as follows :

A woman has had under my observation three children, all syphilitic. The first child was a few months old when I first saw it. It was sent to me for treatment, with the statement that it had been born healthy, had been poisoned by its wet nurse, and in time had poisoned its father. The child and its father manifestly syphilitic.

The mother thought she was sound, and would have passed for being well, except for a very thorough examination, which detected an occasional suspicious-looking macule on the skin, and some small but beautifully characteristic mucous patches upon the throat and inside of the mouth. All three were treated. The baby died. The mother lost her symptoms at once, and considered herself so well that she refused treatment. The father's symptoms continued, and were severe.

After a time the wife again became pregnant in another city. A child was born, apparently healthy.

The mother was a picture of perfect health, and considered herself well; the father was still under treatment. The baby was pronounced healthy by the doctor in attendance, and given to a wet nurse.

The nurse soon got a sore on the nipple, then a sore was found on the baby's mouth, and both nurse and child commenced to give evidences of the syphilitic poison by eruptions. On this account the nurse was accused of having poisoned the child with syphilis, and was discharged. The child's mouth was treated, another nurse was sought, accepted the place, and after a few weeks the family again came to New York. The mother seemed to be in the perfection of health, and no trace of syphilis existed upon her.

The child, now about eight months old, looked like an old man; the head was small, the fontanelle nearly closed, the body wasted, the voice hoarse, while a large fungoid ulcer occupied the corner of the mouth. The father had white patches on the tongue, and squamous, serpiginous spots on the scrotum.

The new nurse was pale, had one raw, hard, beefy-looking ulcer on the nipple and breast about one inch long and a half inch wide. She was feverish, sore throat was commencing, with pains in the bones at night. Nurse and baby were put under treatment. The former continued to have a few mild symptoms of syphilis while under observation (six months). The child's symptoms disappeared under treatment.

Finally, the mother became pregnant again. She seemed to be perfectly well, but I urged her to take treatment continually during the term of utero-gestation. This she failed to do efficiently, because she enjoyed, seemingly, the absolute perfection of health and looked perfectly well. At the end of the eighth month, without cause, the child's movements in the womb ceased. At term, February, 1879, she was delivered of a dead child, the macerated condition of the latter showing that it had been dead for some time. In August, 1879, I saw the mother. She had taken no treatment, but showed no signs of syphilis.

The case is very instructive. Had I not seen the mother before the death of her first child, I should have felt certain that she had no syphilis, for from that date until this writing, now a period of more than three

years, she has not shown the least symptom of syphilis, except by the fact that she has produced two syphilitic children.

Grefsberg (*Vierteljahresschrift für Dermatologie* for 1879) gives a case which is full of interest as bearing upon this point. A woman in 1864 contracted an indurated chancre. In the two following years she had several attacks of secondary symptoms, which necessitated a series of mercurial treatments, and for which she was kept two hundred and ninety-two days in the hospital. In 1867 she married a man who was not syphilitic, and in the space of ten years she had eleven miscarriages. At the twelfth pregnancy, thirteen and a half years after the initial lesion, she went to full term and was delivered of a child which presented indubitable signs of syphilis.

During this period of eleven years she had not infected her husband, nor had she herself seen any symptoms which could be referred to her old syphilis.

Lewin (*Wiener Medizinische Presse*, 1876) gives the history of a woman who, contracting syphilis from a nursling, conveyed the disease to her husband and her own child. The man died from brain syphilis, and the woman later on married again. Seventeen years after contracting her disease, and being for many years previously and at the time of her second marriage apparently well of her disease, she had two children. One died at the age of five and a half months from congenital syphilis, and the other, which up to the age of six years (?) had been free from any symptoms of syphilis, broke out with a syphilitic eruption, which yielded to mercury. At the time of reporting this case the child was fifteen years old.

In this same connection it is worthy of note that the child by the first marriage, which acquired its syphilis, was cured by mercury, married, and later on had a syphilitic child.

Barthelemy (*Annales de Dermatologie et de Syphiligraphie*, 1889) reports the case of a child, aged four months, which was covered with a papular and a papulo-crustaceous syphilide, some of the lesions of which were ulcerated and some were hypertrophic. The eruption was very abundant, and yet the child was in a very good general state of health. There were no osseous lesions, and no appreciable visceral lesions, nor any subcutaneous gummata. The child was born at term, was fat, and normally developed. The first symptoms appeared when the child was three months old, and there was no evidence whatever of a primary lesion. Barthelemy reported it as a curious instance of hereditary syphilis, in which the parents had contracted the disease fourteen years previous to the birth of the child, but where neither parent showed, at the time of the child's conception, any symptoms whatever of syphilis. The history of the parents is briefly as follows:

Married for eighteen years. They both contracted syphilis four years after the marriage. Mother was treated at the Lourcine, and the father at the Midi. The treatment seems to have been very short, and irregularly carried on.

The syphilis in these two persons ran a benign course, and for a long time neither of them showed any syphilitic symptoms. For three years after their syphilitic manifestations they had no children. Then a daughter was born, which died of meningitis at the age of seven years, after twenty-one days of illness. (No further history of this child is given.) A second child, date of birth unknown, died seven months after birth with pustules.

A third one, date of birth also unknown, died at nine months of age while nursing, it was said, of cholera infantilis. The fourth child, date of birth also unknown, died of broncho-pneumonia twenty-five days after birth. The fifth, date of birth unknown, three days after its birth showed interstitial keratitis of the left eye. It is living, three years of age; is small, weazened, of small stature, according to father's statement, but is lively, intelligent, and in fairly good health. It carries upon its person no trace whatever of syphilis, although I believe him to have been syphilitic from the lesion which he had upon his eye, and from the fact that not once but several times he had been in the habit of kissing his brother, who has large and extensive exudating syphilides upon the face, chin, nose, and especially about the lips. This child is the one which you see about four months and a half old, and which has had very serious lesions for a month and a half. The syphilis is unquestioned. It is very marked, so far as the cutaneous lesions are concerned, but benign in the point of view of its general effect upon the system. This syphilis I do not consider as acquired. It is hereditary, and comes not from the father alone (who is not the sole cause of contagion), but from parents both of whom are syphilitic; and I believe that the syphilis was capable of being transmitted by heredity after a period of fourteen years at least.

In view of these cases—and, if space permitted, others could be given—the apparently healthy condition of the mother must be held as no proof that she is really free from syphilis, for it is clear that a woman may go for years seemingly well and yet be syphilitic. The only way to decide the question—that is, whether the mother is really exempt from syphilis—is to inoculate her with the secretion of a syphilitic lesion capable of conveying the disease.

This is precisely what has been done by Caspary, of Berlin; but, before giving his experiment, let me call attention to and comment upon a law which has become famous in its bearing upon the singular fact that a syphilitic child can not seemingly infect its mother, even when she is to all outward signs free from syphilis, and has never been diseased; while to all others, who are brought into equally intimate contact with the child, it becomes a source of great danger.

This law is known among the continental surgeons as Baumés's law, but among the English-speaking ones as

Colles's Law.—Colles, in his work (*Praetial Observations on the Venereal Disease*, London, 1837), makes the following statements:

"The following fact appears to me very deserving of notice. I have never seen nor heard of a single instance in which a syphilitic infant (although its mouth be ulcerated), suckled by its own mother, had produced ulcerations of her breasts; whereas very few instances have occurred where a syphilitic infant had not infected a strange hired wet nurse, and who had been previously in good health.

"It is a curious fact that I have never witnessed nor ever heard of an instance in which a child, deriving the infection of syphilis from its parents, has caused an ulceration in the breast of its mother."

It is this peculiarity which has rendered it exceedingly probable that in these cases the mother, giving birth to a syphilitic child, although herself apparently free from syphilis, is not really but only apparently so, inasmuch as, were she actually free from disease, she would be as liable to infection from the child's pox as others who are inoculated when brought under conditions where the child is capable of conveying syphilis. In order to settle this point definitely, Caspary, in 1875, published an article in the *Vierteljahresschrift für Dermatologie*, under the heading, *Upon the Healthy Mothers of Syphilitic Children*, in which he gives the following case:

A married man acquired syphilis in 1872. During the period of his acute symptoms he abstained from sexual intercourse with his wife, but upon their subsidence he resumed coitus. The woman showed no outward manifestations of syphilis, and was never treated for this disease. In October, 1874, she became pregnant. She had already borne several children, the condition of whom was not mentioned, and about three months later had recurrent uterine hæmorrhages. Early in March, 1875, she was examined, and at the fornix vaginæ a small, hard, circumscribed body was found. (Caspary does not explain what this body was.) A few weeks later the woman aborted, and examination of the foetus showed a gummous infiltration of the maternal portion of the placenta.

The woman recovered from childbed without any bad symptoms or evidences of syphilis. Caspary, in order to satisfy himself if the woman was the subject of latent syphilis, persuaded her to be inoculated with the secretion of an active syphilitic lesion. This was accordingly done in four places, with the secretion taken from mucous patches mixed with blood of a man who was suffering with the eruptive stage of early syphilis and had received no treatment. The result was negative, and after waiting for six weeks the woman was put upon mercurial treatment, on the ground that the failure to be inoculated showed her to be suffering from a latent syphilis.

This case just detailed, taken in conjunction with the instances already given where the mother, although apparently free from syphilis, is yet proved to have suffered from the disease, and remembering Colles's law, deprives the adherents of the belief that the father alone can be the source of the child's syphilis of one of their most powerful arguments in favor of their theory; for, no matter how carefully the mother may be examined, no matter how positively convinced they may be that the

woman is free from syphilis, the question may fairly be asked them: How do you know that the woman has not really had syphilis years before, and that it is still latent? Nothing that you can possibly show will disprove it, and all your statements about the woman's freedom from syphilis goes for absolutely nothing. The fact that treatment on the man's part produces healthy children occasionally, even if you are positive that the woman has not also had treatment without your knowledge, is worthless. Abundant cases exist in the literature of syphilis as trustworthy as your own, which show that treatment on the man's side is nugatory unless the woman is also included, and because at the time of the child's birth the woman may have been—probably was—in that condition known as "repose," where syphilis is not likely to be transmitted. Your belief we can not share, therefore, unless, by inoculation of the woman with the active and inoculable secretions of syphilis, you can prove that you have conveyed syphilis to her.

This is believed to have been done, and the details of the case I herewith record under the heading,

Can a baby, the subject of congenital syphilis, infect its mother, who is apparently free from the disease?

This question comes up as a direct contradiction of Colles's law which we have quoted above, to wit, that a syphilitic child, born of a mother who is without any obvious venereal symptoms at or subsequent to the child's birth, does not convey the disease to her, although it will infect the most healthy nurse, were this latter to suckle it or be brought into the intimate relations which usually exist between mother and child.

The case reported by Ranke, and quoted by Behrens (Berliner klinische Wochenschrift, 1878) is briefly as follows:

A man thirty years of age was infected eleven years before his marriage, but for nine years previously had been entirely free from any symptoms. Three years before the history was recorded he married, and in the first year of married life his wife, presumably free from syphilis, gave birth to a syphilitic child, which was cured by the repeated use of calomel. (The child's symptoms are not given.)

The second child was born during the second year of marriage, and at the end of the second week broke out with a macular syphilide, and with syphilitic ulcerations of the mouth. While the mother was suckling this child an "exquisite" hard chancre appeared upon her left nipple followed by a roseola, which was cured by inunctions of mercurial ointment. Neither the husband nor the first child had shown any syphilitic manifestations since their original attacks. The milk had not been drawn off by a third person.

A most extraordinary case, and, so far as I know, unique in the literature of syphilis. If we accept it—and I suppose it must be admitted until it is shown to be incorrect—we must suspend judgment upon the truth of Colles's law, which we have hitherto accepted, and admit that it may be

possible that a diseased child can infect its sound mother; and, if that be accepted, we are forced to admit, as a corollary, that a healthy woman, one free from syphilis, can give birth to a syphilitic child.

But we must also remember that one case, exceptional to all evidence bearing upon a given subject, can not be admitted as positive evidence until it has been supported by other and undoubted proof, particularly when we consider the liability of error upon any single observer's part. If the lesion upon the mother's breast really was an "exquisite" hard chancre, and what followed was a syphilitic "roseola," the question yet remains whether the child gave its mother her disease; indeed, whether the child's malady was not one of those instances of pseudo-syphilis, an admirable example of which is reported by Besnier (*Bulletin Médicale*, 1887), and which will be found *in extenso* on page 640.

I am free to confess that I believe the woman's lesion was in all probability syphilis, but that the child was not syphilitic, and did not infect its mother; her disease came from some other source, and I am the more confirmed in this view because I do not believe that a man can be free from all manifestations of syphilis for nine years, infect his unborn child without infecting the mother, and that later on this latter falls a victim through the medium of her child, when she herself has had a previous syphilitic one. This is paternal infection run mad with a vengeance, and, to my mind, is as absurd as the stories of mediæval miracles which we read of in history. Still, it is the unexpected which always happens, and syphilis, as we all know, plays most unexpected pranks.

Scarenzio's case is also a very peculiar one:

A girl nineteen years of age, in December, 1874, marries a man who, while in the army, had "a sore and nonsuppurating glands," which healed under simple dressing. No traces of his trouble remained at the time of his marriage, nor have any symptoms of disease occurred since. The woman became pregnant, and, without having at any time perceived the appearance of any syphilitic phenomena, in September, 1875, she gave birth to a very weakly boy, who was born with a reddened skin, and so feeble as to be hardly able to take the breast. When a month and a half old it became jaundiced, and developed a blennorrhagic conjunctivitis that nearly deprived it of sight. The redness became more intense from the inferior half of the belly to the superior half of the thighs, and in this area there were scattered pustules. In the seventh month of its life, the child never having been nursed by any other person but its mother, and this latter never having given her breast to any other child, the infant was afflicted with drooling, together with sores at the angles of the mouth. Associated with this condition of affairs in the child, an ulceration, attended by marked induration, appeared at the lower and outer part of the nipple of the right breast of the woman, together with an indurated adenitis in the corresponding axilla, followed later on by a lichenoid eruption on both forearms. The woman went to the clinic of Prof. Quaglino, and he sent her to me on the 13th of May, 1876. The baby, fourteen days later, died of marasmus.

The mother showed upon her breasts a papule with a proliferated base; she had sore throat, and the lichenoid eruption of the skin noted above. She remained under treatment for thirty-eight days; all the phenomena then disappeared under two subcutaneous injections of calomel of ten centigrammes each.

The woman became pregnant a second time, and in July, 1877, gave birth to another boy, who shortly after birth was afflicted with a pustular syphilide. The mother was attended by her family physician, who treated her with four successive subcutaneous injections of calomel and the internal administration of potassium iodide. This was given because she had a recurrence of her sore throat, and the ulceration of the nipple had returned.

The treatment was followed by good results, no further symptoms appearing until November, 1879, at which time, suffering from leucorrhœa, she returned to the clinic. There were no symptoms of her previous trouble except an indurated gland in the right axilla. The leucorrhœa was caused by a granular condition of the cervix. She was again put on mercurial and iodic treatment, in the belief that as long as there was any glandular induration there was danger of a relapse.

Since that time there is no further report of the woman. Here, also, we may apply the same criticism that was used in Franke's case. From the history, which is very vague, I think the question of the first child's syphilis is open to grave doubt; indeed, I do not believe it was syphilitic. The mother was, I think, syphilitic, but not until after the first child's birth, and then not from her child, but from some other source outside of the infant. Be the cause what it may, these two cases are very curious and interesting ones, but must be supported by better reported and more convincing cases before the statement can be accepted that a woman, although showing no signs of syphilis, can have a syphilitic child and then be infected by her offspring.

Up to what Period of Pregnancy may a Woman become syphilitic and the Child yet escape Infection?—In 1847, Ricord enunciated the belief that until the sixth month the mother may transmit constitutional syphilis acquired during gestation; but if the infection of the mother take place during the last three months, it is not certain that transmission is possible. Up to a few years this opinion of Ricord was accepted without question, but lately cases have been recorded which makes it highly probable that the mother can show signs of syphilis as late as the eighth month of pregnancy, and transmit the disease to her foetus.

Syphilis conveyed from husband to wife at the eighth month of wife's pregnancy.

The case, that of M. Chaballier, is quoted by Durac (Thèse de Montpellier, De l'Hérédité de la Syphilis):

On the 5th of October Madame X. consulted me for an affection of the vulva, which at a glance I recognized as indurated chancres.

There were three: one on each labium minus, and a third one dividing the clitoris. They were very irregular in shape, slightly oblong, with circum-

scribed and smooth borders of the color of ham, not worm-eaten nor burrowing, and on a level with the surrounding mucous membrane. They were accompanied with bilateral, inguinal adenitis, which left no doubt as to the diagnosis. They were, in fact, three typical, indurated chancres. I gave the woman my opinion which came upon her like a thunderclap.

She was a married woman; her husband, absent for five months in traveling, had only passed one day with her, on the 18th of August, and it was to this period only that Mme. X. could ascribe the cause of her disease. She now remembered that among her husband's baggage were some lint and a bottle, the value of which she was now able to explain.

I instituted a purely local treatment with powdered calomel; and some days later, seeing that cicatrization had not commenced, I ordered forty pills of the protoiodide of mercury, beginning with two each day. Twenty pills were taken, and the treatment, both general and local, was discontinued. On the 30th of October, Mme. X. being *enceinte*, was brought to bed at full term. The child, a boy, had no traces whatever of syphilis, nor any general alteration.

I thought it prudent to advise the mother of the possible, though little probable, existence of syphilis in her child, and the consequences which might supervene were the child given to a nurse. It was decided that it should be brought up on the bottle, which was done for several days. But, upon the pressing request of the family, who were entirely ignorant of the reason for my action, a nurse was engaged, and up to the seventh week nothing supervened. Still, being uneasy, I begged the mother to watch her child carefully and to examine the mouth every day, and to advise me if she saw anything at all out of the way. Mme. X. recovered from her childbed very well, and when she got up the chancres were entirely cicatrized, and a month later she left for Italy to join her husband. The child was under the care of its grandmother during her absence. At the end of seven weeks I was called to the child, and found a general papulo-vesicular eruption, especially upon the thighs, mucous patches on the scrotum and under the tongue, on each side of the frenum, and a well-marked coryza. I instantly put a stop to its nursing, and ordered the liqueur de Van Swieten. At the end of fifteen days the mucous patches and the eruption had disappeared, except the coryza, which still continued.

At the same time and about the same date as her infant's trouble, Mme. X., during her journey, discovered mucous patches upon her vulva and about her anus, which were cicatrized by her husband himself with a pencil of the nitrate of silver. All the symptoms disappeared so far as the mother was concerned, but in the child laryngeal ulcerations supervened, and it died after a rapid marasmus, caused either by the disease or by its method of nourishment.

Here we have a case in which the disease was probably transmitted at the end of the seventh month of pregnancy, the initial lesions making their appearance early in the ninth month. The period of incubation was thirty-eight days, if we suppose that the chancres did not appear before the date assigned—i. e., October 5th. It is probable, however, that they began earlier, say on the 25th or 26th of September, which would bring them in the eighth month of pregnancy.

Vajda (Wiener medizinische Wochenschrift, 1880) gives another interesting case bearing upon this subject. It runs as follows:

A little journey made upon the 20th to the 24th of June, 1873, afforded a young married man the opportunity to try his luck outside of his marital relations, returning two or three days afterward to his home. His wife was then in the fourth to fifth month of her pregnancy, and had always enjoyed good health. On August 10th V. examined her, and found her free from chancre or indolent buboes. The husband had a chancre. On September 9th he indulged in coitus with his wife, he then having an unhealed chancre.

She then was in the seventh month of her pregnancy. On October 17th she developed a hard chancre and an inguinal adenitis. Seven to eight weeks after the infecting coitus the man showed several general symptoms of syphilis. Afterward he had papules and a buccal psoriasis. The wife had buccal mucous patches, which repeatedly relapsed. At full term she was delivered of a child, which seven weeks after birth showed papules, and subsequently developed ozena, psoriasis, and pustules. Upon the development of syphilis in the child, the possibility of extra-uterine infection was thought of, but on a review of the history such a theory was rejected.

In this, as in the preceding case, the infecting coitus took place in the seventh month of pregnancy—i. e., on September 9th. Thirty-eight days afterward, on October 17th, in the eighth month of her pregnancy, an initial lesion, accompanied by inguinal adenitis, appeared, and the child, which was carried to full term, although born healthy, showed signs of disease after birth.

Neumann (Wiener Medizinische Presse) gives the statistics of one hundred and twenty cases of syphilitic women, among whom twenty were infected *post-conceptionem*. Of these twenty women, five had syphilitic and fifteen had nonsyphilitic children. The mothers of these five children were infected as follows: One in the third month, two in the fourth month, one in the seventh, and one in the eighth. Of the fifteen children who were born free from manifestations of syphilis, seven died at periods ranging from twenty days to six weeks, but without showing any positive signs of syphilis; four lived, and in four others no data were given.

Taking the mothers of the eleven children about whom information is furnished, one was infected in the first month, one in the third month, three in the fourth month, one in the fifth month, two in the sixth month, one in the seventh month, and two in the eighth month.

One striking point in these statistics is the fact that, of the fifteen children here recorded as being free from syphilis, seven died very shortly after birth, the latest at six weeks, and in four no data were furnished, so that really only four children in fifteen are known to have lived. It is possible that these children had died before the symptoms had time to develop.

The next point which would come up for consideration is, whether

A child born of a syphilitic woman can after birth be infected by its mother and exhibit the signs of an acquired syphilis—i. e., an initial lesion, followed by syphilides of the skin or mucous membranes.

That such can occur has been claimed by Arning, who reports the case (*Vierteljahresschrift für Dermatologie*, etc., 1883).

A woman was infected with syphilis by her husband in the fourth month of her pregnancy. She was treated for light secondary symptoms during the time of carrying the child, and at full term was delivered of a stout, healthy, well-developed child. Two children had been born of this woman previous to her contracting the disease: the first one was living and healthy; the second died during birth, from strangulation by the cord.

The child was born on the 25th of October, 1881. The woman suckled her child with both breasts at first, but afterward entirely on the right breast, as the left was affected with fissures.

Four weeks later the woman noticed at the left angle of the child's mouth a moist patch, which, at first stationary, extended to the upper lip and then began suddenly to destroy the lip. In due course of time an eruption appeared over the body, and the child was brought to the Polyclinic.

It was a well-nourished, healthy-looking child, except for its face, which had been changed in a most remarkable way. Almost the entire upper lip had disappeared, only a small piece remaining at the corner of the right side. That portion which was left was thickened and infiltrated, the surface of the sore was almost dry and free from pus, such as is found in the initial lesion.

The submaxillary glands were very markedly swollen, and the glands of the rest of the body were also swollen, but in a much less degree. On the body was an extensive medium-sized papular syphilide, especially pronounced on the head and scalp.

Nothing on the hands and feet, but about the anus and vulva were moist papules. A month later, periostitis of the index-finger of the left hand developed, and five weeks later the child died. On autopsy, nothing characteristic of hereditary syphilis was discovered.

On reading this report over carefully, Arning's view in considering this case one of acquired syphilis may very fairly be questioned. The moist patch was not an initial lesion, but a mucous patch; and the fact that the glands under the jaw were more swollen than elsewhere, would not be of any more significance than indicating that they had been irritated into an active condition by an inflammatory process going on in the ulcerating mucous patches of the lip. Apparently the eruption came on at the same time the ulceration began, although no very positive statement is made as to the time of its appearance—an occurrence which would not be the case were the lesion from an acquired source, as the law of incubation holds as good with children as it does with adults.

Among the many interesting points which come up for consideration and study in this class of disease is the question, *Can hereditary syphilis be transmitted to the second generation?*

M. Davasse, in his work *La Syphilis, sa forme, son unité*, reports a case as one of hereditary syphilis attacking the descendants of the second generation, simulating affections of a rachitic and scrofulous nature, caries of the bones of the nose, etc., which, although extremely interesting, is

defective in the one important link necessary to prove the point at issue. The patient, a young woman sixteen years of age, is attacked with the symptoms noted above, and which yield in a certain degree to a course of mercury. The grandmother presents a condition of the palate which may very easily have been due to an old syphilis; but the important link in the case—the father's and mother's condition—is wanting. They are said in one portion of the history to have been of excellent constitution, and to have presented the appearance of the most exuberant and perfect health. But there has been no opportunity to examine either of them as regards any syphilitic antecedents, and so long as the history is deficient on these very important points the case can not be accepted as proving the point raised by the question which heads this section.

Mr. Hutchinson (*Clinical Lectures and Reports of the London Hospital, 1865*) gives the history of three cases, which he apparently believes to be instances of hereditary syphilitic transmission to the second generation. They are defective in many important details, and in some of them I think it may be fairly questioned if the point of transmission is proved.

The first case is one in which the mother had a very syphilitic physiognomy; her corneæ were clouded by bygone keratitis. The bridge of her nose was sunken, and her complexion was pale and unhealthy. I asked her to show her teeth, and they proved to be most typically malformed. She was a tall woman, of dark complexion. She told me she had but the one child above mentioned, and that she never had any others, nor had she any miscarriages. She reported that her child, except as to her knee, had never been ill. The child, a girl three years old, was of dark complexion and of well-formed features. She was florid and rather handsome. Her ailment was chronic synovitis of the left knee-joint, the knee being rather swollen, but not especially painful. She had no other disease. Her eyes were perfect, as also her hearing.

In this case there is no evidence to show that the child ever had syphilis. Certainly the synovitis could not properly be called so, and hence this case can hardly be accepted as proving anything in either direction. The mother very probably did have at some time of her life inherited disease of a syphilitic character.

The second case is of no scientific value, because the children of the man who is reputed to have been the subject of inherited syphilis were not seen, and the history which the father gives of them did not show that they had ever suffered from syphilis.

The third case is as follows:

Mrs. W. came under my treatment for syphilitic keratitis. She was a florid young woman, aged twenty-one, who had been married one year, and was now nursing her first child. Although her aspect was florid and she looked fairly healthy, yet she presented, in addition to the keratitis, unmistakable evidences of inherited taint. Her teeth were notched, there were sears at the angle of the mouth, and her forehead was protuberant.

I inquired as to the health of her child, and was assured it was perfect. At my request, she brought it at her next visit, and I found it plump and well-grown, but its nostrils were obstructed, and its buttocks were covered with copper-tinted and scaly patches of an unmistakable character. These symptoms disappeared subsequently under mercurial treatment, and the child is now living and well.

Mr. Hutchinson then goes on to say: "Here, then, we appear to have an instance of a mother who is the subject of inherited syphilis transmitting a taint to her offspring, and that offspring showing the usual conditions of infantile disease. No such a fact has, I believe, been as yet recorded in the annals of medicine, and it ought to be received with incredulity. Might not the taint from which the child suffered be the consequence of acquired disease in one of the parents?"

As regards the mother, I believe such a suggestion highly improbable. She appeared to be a modest, well-conducted person. She was quite young, and respectably married; she had, besides, no symptoms of acquired disease, and, as being the subject of inherited taint, she must be supposed in some degree to be protected from contagion even had she been exposed.

As regards her husband, I made the most careful investigation. He was a commercial traveler, and was under my care on account of a syccosis. He had previously been under the treatment of Mr. Erasmus Wilson and Mr. Startin, neither of whom had suggested that his eruption was syphilitic. Except the eruption, which was syccosis of the most characteristic form, he was fairly free from symptoms. He gave me an apparently candid account of his sexual conduct prior to marriage, and assured me most positively that he never had any form of venereal disease. He was most anxious to be cured of his syccosis, and would, I think, have confessed anything which he thought likely to assist in his treatment.

He was a florid, healthy looking man. I treated his syccosis with syphilitic remedies for some time, but they did no good whatever.

Another case of the kind has been reported by Dr. J. E. Atkinson, of Baltimore (*Archives of Dermatology*, January, 1877):

Julia H., born in America of Irish parents, aged nineteen, married, came to the special dispensary, February 1, 1876, to be treated for an eruption upon both arms and forearms, which had appeared four months previously, when she was more than three months advanced in her second pregnancy. She is well developed, of fair complexion, blue eyes, and light hair; her skin is moderately soft and smooth, her forehead is somewhat square and prominent, and there is a slight flatness across the bridge of her nose, hardly enough, however, to attract attention, were it not for the concomitant circumstances and conditions. The large upper central incisor teeth are shallow, but very positively notched in the style peculiar to subjects of inherited syphilis; they are somewhat undersized, and not in contact with each other. Her eyes present a hazy, boggy condition of the cornea, the remains of a syphilitic keratitis, which, according to the statement of her mother, must have occurred about seven years ago. Her eyes were affected quite a long time, and she was almost blind.

She was treated by an oculist, who cut the cornea of her eyes. There were

no linear cicatrices such as are so frequently seen about the mouths of persons congenitally syphilitic, nor are there any scars suggestive of ulcerative lesions about her person. She has been married three years, and has a child eighteen months old. About one year ago she brought this child to the dispensary with an eczematous eruption about the arms, which disappeared under the application of the benzoated oxide of zinc ointment. It had never undergone any specific treatment, and is at present a healthy, vigorous child.

Some time after the birth of this child the mother was under treatment at the dispensary for a crescent-shaped papulo-squamous eruption upon the thigh, which was considered by my colleague, Dr. N. G. Keirle, who attended her, to be syphilitic. Dr. Keirle at the same time recognized her inherited taint, to which he attributed her eruption. No trace of this eruption remains.

February 1st, the present eruption consists of four or five patches on each arm. They are circinate, their centers being of perfectly healthy appearance. They are composed of quite large papules, with slightly scaly summits. They vary from one half to one and a half millimetre in diameter, the papules being rather smaller than peas. These patches are arranged, for the most part, on the extensor surfaces of the forearms, a few being on the arms. They occasion no itching or unpleasant subjective symptoms, and are colored in the usual manner of syphilitic eruptions. The patient denies having had any sores upon or about her genitals, and her inguinal glands are of a perfectly normal appearance. Her husband, whom I have examined, denies ever having syphilis or any venereal complaint. He presents no symptom of syphilis at the present time.

The evidences of hereditary syphilis in this patient receive ample support from the history of her family. Her father denies ever having syphilis. He has some opacity of the cornea, which he attributes to an attack of violent inflammation several years ago, following a prolonged debauch.

The mother of our patient has numerous cicatrices upon her face, particularly about her forehead, which are very suggestive of old syphilitic disease. Of her offspring four died in infancy, the first in spasms, one year old; the second in spasms, two weeks old; the third and fourth, each at the age of fifteen months; the fifth child is our present patient; the sixth child, a girl, Honora, now eighteen years old, is tall and stout, much resembling her sister in appearance.

She has a decided syphilitic notch of her right upper incisor, and her corneæ are more hazy than those of her sister, for, while the cloudiness in the corneæ of the latter diminishes toward the center, in this girl's eyes it seems to be evenly distributed over the whole surface. Four years ago Honora became suddenly deaf, and was brought to the dispensary for treatment. She slowly recovered under specific treatment, and at the end of six months she was quite well again. Two and a half years ago she again became suddenly deaf and remained so ever since, hearing only very loud noises. She was treated by my friend Dr. Samuel Theobald, who has kindly furnished me the following extracts from his notes: "Almost total loss of hearing of six weeks' duration from otitis media (acute), due to inherited syphilis. Present condition: Left ear, membrane perforated and otorrhœa present; right ear, membrana tympani thickened, vascular, and much depressed. She has nebulous corneæ and history of severe inflammation of the eye. (Her father's eyes are in the same condition.) Eustachian tubes pervious to Politzer's bag, but no improvement to hearing from it."

Dr. Theobald thus thinks that the lesions in the father's eyes are the result of interstitial keratitis likewise.

April 1st, three weeks ago, Julia, the subject of this report, was delivered at term of a small child, which is now of fair size and healthy looking. She has had much headache since her confinement.

The eruption on her arms has faded, the coppery staining having entirely disappeared. The patches, however, still remain, consisting of slightly prominent large papules, not at all scaly, and hardly different from the surrounding surface in color; to the touch they are soft, and as if all inflammatory infiltration had disappeared. She has as yet taken nothing but a tonic mixture and thrice daily four minims of Fowler's solution of arsenic, antisyphilitic treatment being purposely withheld.

June 27th, the eruption on the mother's arms presents the following appearance, viz.: The oldest patches now have nothing remaining except their markings arranged in a circinate form, unelevated and undepressed, whiter than the healthy skin, but not different from it in resistance. New patches, however, have appeared; the older of these, having lost the copper color originally possessed by them, present large papules without discoloration and without any difference from the normal integument. Those patches of more recent date precisely resemble those first described in their syphilitic coloration, configuration, etc. The woman's general health is now good, and the only evidence of the increased intensity of the morbid process is the augmented number of patches which have now invaded the thighs and legs. She bears upon her person no other evidence of syphilis. For the first time she began to take the iodide of potassium in five-grain doses, three times daily, mercury being purposely withheld. By July 28th the papules had all disappeared, leaving in their places the numerous circles of white spots already described. Not a single patch appeared after the iodide of potassium was ordered.

Toward the end of April, when the baby was about six weeks old, its mother first noticed that it had a very feeble voice in crying, and that it was without vigor. It was brought to me on May 18th, suffering from coryza, which it was said to have had for some time.

Scattered over its head, trunk, and extremities were many small spots of roseola, which its mother described as having been more red than at present. They are now of the peculiar copper color of syphilitic eruptions. There existed at the same time numerous minute excoriations about the anus and buttocks, resembling, however, not so much mucous patches as the ordinary conditions of an aggravated erythema produced by long contact with urine and fæces. The child appeared to be tolerably well, and, as there were no immediately alarming symptoms, syphilitic treatment was avoided, benzoated oxide of zinc ointment being applied to the buttocks.

June 27th, the child has fallen off much in flesh, and has acquired a withered and senile look. He cries feebly, almost continually. About three weeks ago he began to roll his head about on the pillow, and at the same time fresh spots came upon the skin. The erythematous and excoriated condition of his buttocks persisted, while on the scrotum it amounts to an eczema, red, raw, and exuding. There is diarrhœa.

The roseolous patches are scattered all over the integument. They are generally small, but sometimes coalesce into large patches. They are dry, and almost without discoloration.

About the buttocks, along the limits of the old erythematous surface, they are wrinkled. Their general color is a characteristic ham or copper color, different from the nonspecific erythematous eruptions of infants. The palms of the hands and the soles of the feet are reddened, dry, and wrinkled, not scaly. There is some coryza, but the child does not snuffle, nor are there any fissures or cracks about the nostrils. The corners of the mouth, however, are slightly fissured. The peculiar muddy or yellow-clay color of the face, and especially of the eyebrows, is very characteristic. The benzoated oxide of zinc ointment is applied to the buttocks and the scrotum, and a flannel band smeared with equal parts of the above ointment and mercurial ointment is to be wrapped around the body, newly applied overnight.

By July 8th the eruption is noted as fading, the epidermis of palms and soles is peeling, and the body is described as much better.

July 28th, the bandage has not been applied for ten days, owing to the intensely hot weather. The roseola is gone, leaving a faint staining, and the child is very much better.

August 28th, the child has had an obstinate diarrhœa, which has reduced it very much. There are no other symptoms than an almost entire voicelessness, the mouth, in crying, being widely opened, while there is scarcely any audible sound given forth. The infant was not again brought to me, nor was it again under medical treatment.

It died October 7th. It had taken no medicine for weeks, I was informed by its mother, and it had a persistent diarrhœa, and toward the last "inward spasms" and rolling of the head.

The next case is one reported by Cæsar Boeck, of Christiania (*Annales de Dermatologie et Syphiligraphie*, October, 1889):

The grandmother was treated at the age of eighteen years—from April to July, 1854—for ulcerations of the genital organs, a macular syphilide, and mucous patches of the right tonsil. She entered hospital again in July of the same year with an ulceration of the posterior commissure and the labia majora, was treated with calomel, and went out in September, 1854.

In March, 1860, she brought her child (a girl) to the hospital, the said child being then two months old. It was treated in the hospital by Prof. W. Boeck for severe congenital syphilis until July, 1860.

Three years later (1863) it returned to the hospital with an affection of the eyes, which was first believed to be a scrofulous ophthalmia, but which was undoubtedly of syphilitic origin. Re-entering the hospital in May, 1889, the child, now a woman grown, bore the indelible marks of congenital syphilis in the shape of rugous cicatrices about the mouth, the traces of an interstitial keratitis of both eyes, and almost complete atresia of the iris of the left eye, the sight of which was entirely lost. In addition, the median upper incisors showed the crescentic notch of Hutchinson.

This woman, twenty-nine years of age, brought, in May of the present year (1889), her son, who is suffering with a clearly marked congenital syphilis. This child was born on the 7th of December, 1888, and is nearly five months old. The disease showed itself when the child was two and a half months old, and began with a coryza, accompanied by a maculo-papular syphilide situated in the inguinal folds, upon the thighs, and lately upon the face, especially about the mouth, the chin, and the forehead. At its entrance, the child, besides

this macular syphilide, showed red and glistening patches upon the palms of the hands and soles of the feet, and of the palmar and plantar surfaces of the fingers and toes; upon the lips and corners of the mouth were deep and bleeding fissures; and, during its stay in the hospital, periostites developed upon the internal surface of the two tibiae, which disappeared, together with the other symptoms, under the use of the iodide of potassium.

Boeck thinks that here he has without question a case of congenital syphilis in the child, and, in order to be certain, he subjected the parents to a careful questioning, and they both assured him that none other but themselves had cared for the child.

In order to prove positively that this was a case of congenital syphilis transmitted to the second generation, it was necessary that the heredity on the father's side and reinfection on the mother's side should be absolutely excluded. For this purpose he subjected the father, who is forty-five years of age, to a very careful examination. He denied absolutely having had syphilis at any time; he said that he had been married for the first time at the age of thirty-two; that his first wife, by whom he had no children, died in 1883; and that he married his present wife in 1884. A careful examination failed to reveal any trace whatever of a preceding syphilis. He was in every sense of the word an apparently sound man, and appeared younger than he really was. The mother's history was that before her marriage she had a child by another father in September, 1883. This child was born in the Maternity Hospital at Christiania, and neither upon herself nor upon her child were any traces discernible of a recent syphilis. When the child was fifteen days old it was separated from its mother and given in the care of strangers, but it died when a month old in consequence of convulsions. According to the mother's statement, it never had any eruptions before its death.

In 1884, as has already been stated, she married, and in May, 1886, she gave birth to her first child from this marriage. This child in every way was in flourishing health up to the age of two years and two months, when it was affected with a scarlatina, and died with the symptoms of croup. The second child is the one under consideration, and which is affected with hereditary syphilis. Thus, after a careful examination of the mother, it has been impossible to discover any traces of a recent syphilis. This circumstance, as well as the fact (?) that the first two children have shown no signs of syphilis, and, above all, that the second child was in a state of perfect health up to the age of two and a half years before succumbing to its attack of scarlatina, induces Boeck to believe that the mother had not been affected in any way with recent syphilis; "for," he states, "it is well known that the more inveterate syphilis is in the mother the greater the possibility for a diseased child to be born after a healthy one; and, if the mother had acquired syphilis after the birth of

her second child in 1886, she would in all human probability have infected her husband, who was not diseased."

A perusal of these cases would lead to the belief that syphilis may be conveyed to the second generation; but, notwithstanding the care with which they have been reported, the fact may yet be questioned, particularly when we recollect how difficult it is to positively exclude the existence of an attack of acquired syphilis in the heredo-syphilitic person, either from his or her statement, or by a personal examination. This very naturally suggests the question:

Can the subject of hereditary syphilis acquire syphilis later in life?

Mr. Jonathan Hutchinson, in *The Clinical Lectures and Reports of the London Hospital for 1865*, gives the history of some cases, only one of which, however, is of any peculiar value in proving (?) this point.

E. H. M., aged twenty-one, was admitted under my care at the Mooresfield Ophthalmic Hospital, July 6, 1863. His right cornea was inflamed, and he stated that it had followed an injury from lime a fortnight before. The cornea was diffusely opaque, and the eye was very irritable. I prescribed at first tonics internally and opiate fomentations, being misled by his statement that he had lime in it. On the 20th I recognized iritis of a slight degree and the dotted condition of the cornea, taken with the slight inflammation of the iris, presented a condition similar to what used to be called "irido-capsulitis." Iodide of potassium was now prescribed. In the middle of August the left cornea began to inflame. At this time the right cornea was so opaque that it was impossible to inspect the iris, and it presented the exact condition of syphilitic keratitis. His physiognomy did not suggest hereditary syphilis. It is true that his skin was pale and of a bad color, but his nose was narrow, with a very high bridge, and his teeth were perfect in form, size, and color. In making inquiries into his history, he mentioned that his mother had suffered in her eyes, and, thinking that some light might perhaps be obtained in respect to his own diathesis, I requested that she should attend.

His Mother's History.—On August 29th Mrs. M. attended with her son, and brought with her one of Mr. Thomas's out-patients' letters. From notes on the letter, I found iridectomy for synechia and relapsing iritis had been performed six years ago. She had obtained great benefit from the operation. There were still bands of synechia in the lower part of the pupil. The original attack of iritis had occurred twenty-five years ago. On being taken aside, Mrs. M. told me without reserve the whole history of her troubles. Her husband had been a most dissolute man, had frequently suffered from venereal disease himself, and had communicated sores to his wife several times. Her worst attack was when the iritis occurred, at which time she had a very free rash. Several of her children had died of the disease. Our patient was one of her younger children, and was born six or seven years subsequent to his parent's contamination. The three infants preceding him had all died. In infancy he suffered from a rash, and was treated by Dr. Reese, who referred it to the venereal taint. After infancy he had fair health until about the age of fifteen, when his left eye inflamed.

Acquired Disease.—He was under my care for gonorrhœa four years ago, and since that has been much exposed. A year ago he appears to have had true syphilis. He does not recollect a chancre, but he had a copious, scaly rash, and a bad sore throat. This lasted for three months or more. The surgeon whom he attended told him it was syphilis, and gave him *mercure* to salivation. Although he did not recognize the chancre, I think there can be little doubt that he had one. His description of the rash is very minute, and numerous spots occurred on the penis and scrotum; so it is very possible he may have mistaken the original sores. Since it was well he has had a sore, and also a gonorrhœa.

February 20, 1865. He has remained steadily under treatment with iodides, etc. The corneæ have gradually cleared: with the left eye he reads *minion* size; with right, only words of great *primer* size.

In both eyes clouds still remain in the corneæ, and, in both, the ciliary regions look thin and bluish. He has still a little *psoriasis* about the lips and chin, and a few patches on the body. In other respects he is in good health. There are no *iritic* adhesions.

This is certainly a pretty distinct history, and gives in detail a presumable history of syphilis in the mother, together with one in the child. Moreover, the boy himself, when he reaches years of discretion, contracts syphilis on his own account, and presents unmistakable symptoms of the disease. There is little to criticise in the case on the ground of lack of detail, as, in the minor points which are wanting, there can be no human possibility of obtaining absolute knowledge unless the reporter had seen the boy during his infancy and followed the case up from that time on. Indeed, the *minutiæ* of the case are unusually well worked up.

If in these cases we follow analogy, comparing the course pursued in acquired syphilis in cases of reinfection, there is nothing which is not perfectly possible, and which can not be accepted as likely of occurrence in the case just given. In acquired syphilis it is not believed that the second infection occurs while the first diathesis is still present; but when that has disappeared a second infection is possible, and many well-attested cases exist in medical literature as showing that such a possibility does occur. Why not the same thing in hereditary syphilis?

While the diathesis existed there is no reason for supposing that infection can exist; but when for any cause this diathesis ceases to be operative, then a person becomes again liable, and, upon exposure, may contract the disease again.

There is nothing in the case of Mr. Hutchinson to militate against this view. The subject of the treatment receives an injury to the eye which excites a *keratitis*, at first diffuse, but which subsequently shows the punctate form such as is found in hereditary disease, but which did not come on at this time. The probabilities are that it happened during the young man's infancy, and that it was masked by the acute inflammation which followed the injury.

In addition, *iritis* declared itself, but nothing else which could be

referable to the inherited taint. The mother's history is clear, and points without reasonable doubt to syphilis in her, thus strengthening the suspicions produced by the son's eyes. He then contracted syphilis, and although he did not recognize the initial lesion, and was thus led to deny its presence, it probably existed. But it may be urged that his statement about the nonexistence of the chancre was true: that this was not a case of acquired but of hereditary syphilis.

What can be opposed to this view of the case? The symptoms which appeared were a scaly rash and a sore throat. Now, had this outbreak been one of hereditary syphilis, the symptoms coming on at the age of twenty-one would have been of the advanced—the ulcerative—type, and not of the character here described. To my mind, there is not the least reason for questioning the correctness of the view that this belonged to an acquired syphilis, and I further think that this man had previously suffered from hereditary disease as well.

BACTERIOLOGY OF HEREDITARY SYPHILIS.

In 1886, Kassowitz and Hochsinger, of Vienna (*Wiener Med. Blätter*, 1886), called attention to the result of autopsy in five cases of hereditary syphilis, in which they found streptococci in the bullæ of pemphigus, in bones, liver, pancreas, and thymus glands. These bacteria were found in the smaller blood-vessels and in the interspaces of tissue, but never in blood-corpuscles nor the interior of cells and fibrous tissue. While not prepared to say that these streptococci were the direct cause of hereditary syphilis, Kassowitz and Hochsinger believed that they played an important rôle in the course of the disease.

Chotzen, of Breslau (*Vierteljahresschrift für Dermatologie*, etc., 1887), examined the bones in three cases, the skin in nine cases, the liver in six, the glands in two, the intestinal mucous membrane in one case, and the umbilical cord in one case, and found streptococci in the following instances: in the bones once in three times, in the skin five in nine times, in the liver four in six times, and in the intestinal mucous membrane in the single case where he examined this tissue, confirming Kassowitz's and Hochsinger's researches. The result in the umbilical cord is not given.

Chotzen found that in the skin the streptococci were seated principally in the small vessels of the subcutaneous cellular tissue, in the neighborhood of the large vessels and of the sweat and sebaceous glands, but never in the fat-cells nor in the glandular tissue. The same was true of the liver and bones.

They were especially abundant in the intestines, in all the coats (serous, muscular, and submucous), and in the mucous layer, especially about the tips of the intestinal villi, particularly those which had been deprived of their epithelium. They were never found in the blood-

vessels, but about their periphery, and were abundant in the lymphatic spaces.

Chotzen admits that streptococci are not always present in cases of hereditary syphilis, and are sometimes found where there is no evidence of the disease; nevertheless, he believes that, while there is no proof that they are the cause of the syphilis, they play a by no means unimportant rôle in the final result, producing a fatal result when they are abundant.

MORTALITY OF SYPHILITIC INFANTS.

Published statistics show a large mortality, and it will be interesting to note, first, the proportion of dead to living children; and, second, the symptoms which these dead children present.

The first set of figures is taken from the records of births of syphilitic children at the Moscow Hospital, from 1850 to 1870 inclusive, with deaths from this cause:

YEARS.	No. of children.	Deaths.	Percent-age.	YEARS.	No. of children.	Deaths.	Percent-age.
1860.....	224	148	66	1866.....	165	124	70
1861.....	204	150	75	1867.....	174	131	69
1862.....	140	93	67	1868.....	208	152	73
1863.....	150	123	82	1869.....	184	116	63
1864.....	198	139	70	1870.....	184	118	65
1865.....	171	131	70				

From these statistics it will be seen that the highest percentage reached was eighty-two, the lowest sixty-three.

The next list is one furnished from the statistics of sixty-one cases occurring in Sigmund's wards, and are collected by Dr. Pick. It gives the duration of the mother's disease, the form of her syphilis, whether she had been treated with or without mercury, and the condition and results of the births. Although in some of the cases it is an open question whether the children really succumbed to syphilis, it is hard to avoid the conclusion that they did, after all, die as a result of their inherited taint, even though indirectly. Thus the cases of pneumonia, diarrhœa, and tabes are probably due to the syphilis, although all three diseases may occur independently of syphilis.

Out of these sixty-one births, fifty-nine died, seventeen were premature births, and forty-four were at full term. Of the seventeen premature births, eleven were born dead; of the forty-four at full term, three. Of the forty-seven living children, four lived more than three months; and in two the result was unknown. Of the remaining forty-one, the mean duration of life was twenty-six days—the shortest period being one hour, the longest ninety days.

DATE OF APPEARANCE OF SYMPTOMS IN INHERITED SYPHILIS.

An important question comes up as to whether the indications of inherited disease appear immediately at or after birth, and, if the latter, how soon after? At one time the belief was current that syphilis was manifest at birth, or a few days subsequently. But further investigation showed that, while this is true in a large proportion of cases, many instances occur in which the manifestations of syphilis are delayed for several months. Roger (*Union Médicale*, 1865) collated two hundred and forty-nine cases from several sources; Diday, one hundred and fifty-eight; De Méric, twenty-eight; Mayer, forty-nine; Roger, fourteen. In two hundred and seventeen of these syphilis appeared before the end of the third month, and in thirty-two it came later. Sifting these cases still closer, it will be seen that, although a very large percentage occurred early in extra-uterine life, there were several cases in which the manifestations of the inherited disease were delayed long beyond the usual three months. Thus, in Diday's cases (*Syphilis des Nouveau-Nés*), syphilis appeared before the first month in eighty-six cases; before the second month in forty-five; before the third month in fifteen; at the fourth month in seven; at the fifth month in one; at the sixth month in one; at the eighth month in one; at the twelfth month in one; and at the twenty-fourth month in one. Of these one hundred and fifty-eight cases, syphilis appeared in one hundred and forty-six before the end of the third month, leaving twelve cases in which the outbreak of the disease was delayed till later. Taking these one hundred and forty-six cases in which syphilis appeared before the expiration of the third month, it was found that eighty-six of them took place before the end of the first month, and one hundred and thirty-one before the end of the second month.

Twelve cases are left in which no signs of syphilis appeared up to the end of the third month, and, of these, ten presented evidence of disease before the expiration of the first twelve months of extra-uterine life; two only are left in which the disease is still further delayed.

The same author gives another series of one hundred and five cases, in forty-five of which symptoms appeared before the end of thirty days after birth; and, of these forty-five cases, twenty-four were attacked before the end of fifteen days; and, of these twenty-four, ten before the end of the eighth day.

De Méric (*Lancet*, London, 1858) gives the result of twenty-eight cases in which the date can be assigned for the appearance of syphilitic manifestations. Of these twenty-eight cases, syphilis appeared in two cases a few hours after birth; four cases, one to ten days after birth; five cases, ten days to three weeks after birth; ten cases, six to thirteen weeks after birth; one case, twelve months after birth; one case, thirteen months

after birth; one case, fourteen months after birth; one case, fifteen months after birth; one case, twenty-one months after birth; one case, twenty-seven months after birth; and one case, eight years after birth.

It will be seen that twenty-one out of twenty-eight cases occurred within the first three months, and only seven after that period, agreeing pretty closely with the result of Diday's experience.

Luzinski (Wiener medizinische Zeitung, 1884) gives as the result of his experience the following statement: "It is seldom that syphilitic manifestations show themselves earlier than the sixth week or later than the third month. In fifty-three per cent of the cases they occurred between the sixth and eighth week after birth, and in only sixteen per cent do they occur after the third month."

It is very evident that the majority of cases present manifestations within the first three months, but a small number of cases are said to occur several years after birth without having shown any symptoms prior to that time. This is contrary to the generally received opinion, which assigns one year as the outside limit in which symptoms can possibly occur; and if none appear within that period, that the child may be considered as exempt from any chance of showing subsequent manifestations. Indeed, Diday assigns a much shorter period, for he says that when the third month is once passed there is not much probability that any symptoms will manifest themselves.

Is it possible, then, that syphilis can be latent for several years without showing symptoms during the earlier period of the child's life?

I do not believe that it can. The time at which this late outbreak generally occurs is about the age of puberty, a period at which inherited syphilis is prone to show itself. It must be borne in mind that there are three periods in the life of a subject of inherited syphilis in which the disease is likely to crop out, viz., at birth, at puberty, and at the close of middle life. If a child is born apparently perfectly healthy—and many a syphilitic child is so born—early manifestations are apt to be slight and escape attention, or to be assigned to other causes. These symptoms will in time then disappear of themselves, leaving no trace behind; and when the child later on, at the age of ten, twelve, or fourteen years, presents symptoms which are unquestionably syphilitic, it is believed that they are the first manifestations, and the case is heralded as one of those instances of infantile syphilis which has been delayed for several years. These are the cases which the older writers described under the name of "struma."

Sometimes the surgeon is fortunate enough to discover cases of interstitial keratitis, of scars about the angles of the mouth, of Hutchinson's teeth, of an old iritis, or an arrest of development, which at once serves to notify him that earlier trouble has existed, notwithstanding the history

of previous immunity. Sometimes, however, he discovers nothing, and he is thrown back on his own resources to determine the truth of the patient's statement.

One circumstance will serve him as a guide, viz., the character of the lesions under observation. They are always, so far as my experience goes, those pertaining to the late forms of syphilis, those classed under the time-honored name of tertiary syphilis. Throwing aside, for the present, the cases of children who are so profoundly poisoned by syphilis that they sometimes show at birth an advanced stage of the disease, inherited syphilis displays much the same course which the acquired variety does. It follows a pretty regular gradation from the lighter to the more severe stages. If, then, patients of thirteen or fourteen years of age present themselves to the surgeon with periostitis, ulcerations of the palate, or serpiginous ulcerating lesions of the skin, which he is satisfied comes from inherited syphilis, he can infer previous milder manifestations of the disease, as certainly as the paleontologist will deduce the existence of extinct fauna from the imprints which they leave behind them on the rocks and sandstone, though he has never seen the animals himself. *Ex pede Herculem*. Syphilis often leaves its story so plainly written that he who runs may read; and although the earlier symptoms have come and gone and left no trace behind when the late syphilides appear one may be sure that previous symptoms have existed. It is not that I doubt the existence of syphilis hereditaria tarda, but what I do not believe is that inherited syphilis remains latent for several years before declaring itself, and no cases that I have yet seen or read about have convinced me to the contrary. Durac, in his *Thèse de l'Hérédité de la Syphilis*, quotes Ricord as saying that he has seen the symptoms of inherited syphilis make their first appearance after an incubation of ten, twenty, or more years. This was stated at the Séance de l'Académie de Médecine, October 8, 1853: "Qu'il a vu des sujets chez qui la verole héréditaire ne s'est manifesté qu'à l'âge, de quarante ans."

This statement I have not been able to verify; but, if true, it is an extraordinary fact.

Quesada (*La Syphilis Congénitale*) records three cases of inherited syphilis in which the symptoms first manifested themselves at the ages of six months, two years, and three years, respectively; but it is very doubtful indeed whether any of them were cases of inherited syphilis.

Robert (*Maladies Vénériennes*) gives the history of two cases, in one of which the patient was sixty-five and in the other forty-two years of age, and in whom no other symptoms had made their appearance. The cases are extremely doubtful, are not convincing, and do not, in my opinion, prove anything.

Gréssant (*La Syphilis Héréditaire Tardive*) gives a case of Dumesnil, in

which the patient was aged seventeen when he came under observation with the symptoms of syphilis; but in this boy there was evidence to show that he had had manifestations of his disease in early life.

Augagneur (*Étude sur la Syphilis Héritaire Tardive*) gives the history of two cases, one of which is personal, the other is communicated by M. Horand. In the first, the symptoms—periostitis of the tibia and cephalalgia—commenced when the patient was twenty-six years of age, and were finally cured by iodide of potassium. His mother had been syphilitic, and he was born five years after his mother's infection, although it is stated that he had not had any symptoms of inherited disease, nor had he acquired syphilis. It is very unlikely that, with these antecedents, he should have gone through twenty-six years of his life without showing some of the earlier symptoms, which would, I think, leave no traces of their presence.

In the second case there was found a retino-keratitis, with a central corneal opacity, which was probably the result of ocular trouble in his infancy; and, if so, to what so likely due as to syphilis?

Fournier, in the *Gazette Hebdomadaire*, Paris, gives the history of a man in whom the symptoms appeared in his thirty-first year, but previous manifestations had occurred in early life. The case is as follows:

M. X., aged thirty, presented himself to M. Fournier with lesions which were evidently gummous ulcerations of the penis. He denied absolutely and in the most emphatic manner that he had ever acquired syphilis. On examining the patient further, Fournier found that he had a bilateral kyphosis, which had existed since infancy; evidence of an old keratitis, and lesions of a serious affection of the kneejoint.

Dr. Hermet examined the patient's ears, and reported that on the right side a watch was heard only at ten centimetres distance. The tympanum was misshapen, thickened, and presented disseminated fibrous bands across it. There was then no perforation, but he said it probably existed formerly.

The ossicles were partially anchylosed. The left ear could only hear the watch on contact. There was a perforation of the upper segment of the tympanum on the line with the angle of the malleus.

Keratitis had come on when the patient was fourteen years old, had lasted for several months, and was very serious, making him almost blind. The traces of this affection were still apparent.

One of the knees showed a notable deformity with cicatricial bridges, a slight retraction of the leg, limitation of movement, and pronounced lameness. About the articulation, cicatrices of varying size and dimensions existed, evidences of periosteal abscesses and cutaneous ulcerations.

The patient had strenuously denied having acquired syphilis at any time, and it was only when Fournier suspected syphilis that he said he believed it was of hereditary origin, and that his family physician could give a clue to the correct cause of his present trouble. On referring to this gentleman, the following condition of things came to light:

1. That the patient's mother, when *enceinte* with him, had acquired syphilis from her husband.

2. That the patient shortly after birth showed various syphilitic symptoms, which were treated as such by the doctor.

3. That he was puny, and brought up with much difficulty.

4. That at the age of two years he showed the affection of the knee described above, which was chronic in its course, and of a serious nature, attended with multiple abscesses about the joint, exfoliation of bone, adhesions of the joint, and peripheric ulcerations, all of which finally yielded to protracted treatment with the iodide of potassium.

5. That he infected the nurse, who suckled him, with syphilis.

The patient recovered from the ulcerations of his penis under the use of iodide of potassium, iodoform, and baths.

While the case is particularly instructive as showing that symptoms of inherited syphilis occur late in adult life, it is also worthy of note that at the time these lesions occur they are single and of such character that they might not be referred to their true cause. If the surgeon be on his guard, and is a careful diagnostician, he will probably find traces of previous troubles which will put him on the right track, and enable him to give a correct opinion of the case. Just such an instance occurred in the history reported by Bulkley (*Archives of Dermatology*, 1878), which is briefly as follows. In the first case he was consulted in regard to a female patient, who was supposed to have lupus, but upon seeing her he at once suspected inherited syphilis.

She was twenty-three years of age, and was very much below the size which would be expected at her age. She was undeveloped, and had more the appearance of a girl from eleven to thirteen years of age, instead of twenty-three, although intellectually she was quite equal to her years. The forehead was square, rather prominent in the sides, and sunken in the middle. The teeth exhibited in a most remarkably characteristic manner the peculiarities recognized as belonging to hereditary syphilis. The upper central incisors were notched and greatly thickened. The other incisors were also malformed, were very small, and the canine teeth were curiously peg-shaped. The lower teeth were very small—not larger than those of a child eight years old. They stood separated, and were more or less irregularly placed.

Her history was that at four years of age she had an abscess under the right jaw; at five she had severe spasms on three occasions, remaining for hours without speaking. When twenty years of age she was under the care of the late Dr. Althof, of New York, for double vision, at which time she suffered with the eyes for three years. Her mother, also a very intelligent woman, said the patient never had any eruption on the skin but the present one, except a small spot on the inside of the right thigh soon after birth. This may have been a mucous patch. She gives no other history of the earlier manifestations of the disease. The eruption for which she consulted me appeared first during the preceding September, nine months previously. She then noticed a small swelling on the anterior surface of the lower third of the right arm. It was hard,

and of a reddish color. She poulticed it; it broke, discharged, and has increased in size since, with the addition of new masses around it.

When first seen there was on the lower third of the right forearm an irregular-shaped mass of gummous induration, about three inches wide, and extending two thirds of the way around the arm. It was perforated in many places by points of ulceration and sinuses from which there appeared to be a moderate amount of discharge.

At times the pain was very severe in it, so as to prevent sleep. She had been variously treated by a number of regular and irregular practitioners ever since its first appearance, with no benefit, but, on the contrary, with a constant increase in its size.

The treatment generally consisted in local applications. On questioning the mother, I learned the following family history: She had had sixteen pregnancies, the first four resulting in healthy children, two of whom are living and healthy at thirty-eight and thirty-nine years of age. One child died at thirty-one years, and a boy at eight months, from natural causes. She then contracted a venereal disease, and had an eruption on the buttocks. She then began to have miscarriages, and ten dead-born children followed each other, all at nearly or about full term, with one exception. She says they would appear to die *in utero* about six days before delivery, when she would feel a shivering sensation pass over her.

Two years elapsed between the last stillbirth and the birth of the present patient, who appeared healthy, with the exception mentioned of a small eruption on the right thigh.

She was placed upon bichloride of mercury and iodide of potassium in small quantities, and in less than two months the lesions had entirely disappeared.

In this case, with the sole exception of the small spot on the thigh, there was a total denial on the part of both the patient and the mother of any lesions of the skin, and the first apparent one did not come on until the girl was twenty-two years of age. The trouble of the eye for which she consulted the oculist may or may not have been due to syphilis, but at any rate, supposing it was not, it is singular to mark that the teeth showed peculiarities which we recognize as belonging in the majority of cases to inherited syphilis, and, with such lesions remaining after, it is not at all likely that the child escaped during its earlier years without some other symptoms referable to its syphilis. The mere denial on the part of the patient and her mother goes for nothing at all, inasmuch as patients, even those of a fair degree of intelligence, are absolutely ignorant and stupid when it comes to the question of knowing symptoms or of giving a rational statement of previous disease.

LESIONS OF THE SKIN IN INHERITED SYPHILIS.

The lesions of the skin occurring in children who are the subjects of inherited syphilis vary in form and intensity, dependent upon how soon they appear after birth.

The congenital type is apt to be the most severe—that is, where the

symptoms are present at the time the child is born, and milder when the lesions do not come on till some months after birth. Sometimes the foetus is cast off before full term with macerated epithelium and evidences of pronounced alterations of the skin. At other times the child is carried to the full term and is born with pemphigus, in which the epidermis is raised over the entire body (in the form of bullæ), which is readily stripped off, leaving a red, excoriated surface beneath. Again, the child is born with a papulo-pustular eruption of the body, especially on the palms of the hands and soles of the feet, which desquamates and shows slight ulcerations beneath. But many syphilitic children come into the world apparently sound and healthy, and remain so for several months after birth, showing as the first evidence of their disease a macular or a papular syphilide of the skin. In those cases where the poisoning is profound, in which the child is born with a pemphigus or with a pustular syphilide, the mucous membranes are affected in a similar manner to the skin. The epithelium is stripped off from the buccal cavity and from the throat, leaving the subepithelial surfaces raw and denuded. If the child is born alive, there is frequently found a bulging of the forehead (hydrocephalus), excoriations about the angles of the mouth and about the anus, the respiration is impeded by lesions in the throat and mucous membrane of the nasal cavities, the voice is altered in volume and sound, the cry is stridulous and hoarse, the child is pale and wizened, having the appearance of premature age, and the body lacks the plumpness of infancy. Associated with this is an obstinate diarrhoea dependent upon lesions of the intestinal mucous membrane.

At the autopsy the viscera are found to be profoundly altered and are frequently the seat of infiltrations referable to an advanced stage of syphilis.

But, as has already been stated, the newborn child may present all the appearances of good health. The body is full and well nourished, the color is normal, the functions of the body are well performed, the cry is that of a child in good condition; there is no snuffling, or any bulging of the forehead—in short, there is nothing to denote that the child is affected with syphilis. But after a few months the child's appetite begins to fail, it no longer suckles as well as formerly, nor does it seek the teat with its previous avidity. The cry is observed to become hoarse and squeaky, the child does not sleep as well or as soundly as it should, and it is peevish and irritable. With this condition of things, either simultaneously or soon after, the eruption is seen over the entire body, invading the face, the body and thighs, which is often overlooked, or, if noticed, is attributed to other causes. At the same time the mouth is observed to be sore, and to interfere with nursing. If carefully inspected, the mucous membrane is seen to be the seat of opalescent spots, slightly raised above the

surface of the tissues and seated in the subepithelial layer. This is the lesion so often called "sprue" by nurses.

Macular Syphilide.—The eruption commences in the form of macules of the skin, which are not raised above the surface of the integument, of a shade varying from pink to a bright red, easily effaced on pressure, but returning as soon as the pressure is removed, desquamating rapidly, and, from the heat and moisture incidental to a baby's skin, quickly losing their epithelial layer. Especially is this the case in the folds of skin about the infant's neck and its genitals, where they assume the appearance of the moist secreting papules of the acquired variety, and constitute mucous patches of the skin.

Under treatment these macules rapidly disappear, the child resumes its former healthy appearance, the functions are properly carried on, and the child seems to get over its trouble. This improvement is deceptive, for in a short time the child presents evidence of a new eruption, or else (this more rarely) the macules return.

Papular Syphilide.—If the disease is progressing, the next outbreak of the skin occurs after an intermission varying from a fortnight to four or five weeks, usually the earlier period, in which the child's body shows a papular eruption seated principally on the buttocks, the face, palms of the hands, and the soles of the feet. This lesion is elevated above the surface of the skin, does not readily disappear on pressure, each papule is crowned on its apex with fine scales, the papules themselves being of the acuminate variety, closely grouped together, and seated upon a reddish, elevated base. The grouping of each patch is circinate, with sound skin in the center; sometimes the circular form is not complete, and the groups present irregular shapes. The tendency of these patches is to coalesce, without very characteristic changes, from single papules closely grouped together to broad papules which desquamate abundantly; they are prone to crack and become fissured, and, when seated at the angles of the child's mouth, are a constant source of pain every time it opens its mouth. This variety is most commonly met with on the palms and soles, and at the angles of the mouth. They bleed readily on the slightest motion of the skin covering these parts, and are very obstinate and rebellious to treatment.

Vesicular Syphilide.—Another form of eruption which has been described is the vesicular syphilide, which first appears somewhat as does the miliary variety of papule, except that the papule, instead of desquamating at its apex, becomes vesicular. This variety I have never seen myself, and, while not denying the possibility of its occurrence, I am somewhat inclined to think that a vesicular eczema has been mistaken for a syphilide.

In support of this view I shall quote a case which was presented by

M. Besnier at the Réunion Clinique Hebdomadaire de Médecine at the Hôpital St. Louis (*Annales de Dermatologie et de Syphiligraphie*, 1889), which is entitled "Syphiloïde Vacciniforme Infantile."

The child's history is briefly as follows:

It was born at term on the 14th of October, 1888, of healthy parents. The child was put out to nurse, was raised on a bottle, the nurse herself being sound. The maternal history is as follows: Children—one girl died at twenty-two months, of diarrhœa, without any other accident, and never showed any lesions of the skin. The second, a boy, born a year later, now living at the age of five, and healthy. The third child, born three years afterward, aged twenty-five months, always in good health; and, fourth, the child which is the subject of the discussion. The father, forty years of age, was examined, and no evidence whatever of any syphilitic taint or lesion was found, either recent or old. The mother also shows no indications of syphilis. The child a month ago had a severe diarrhœa; eight days later the mother was invited to take back her child upon the advice of the physician of the locality, who declared it was affected with a contagious disease. The mother received it again on the 27th of February, 1889, in the following condition: The child, although emaciated, was well built, and showed about the labia majora throughout the whole extent and in the inguinal folds, a large number of flat, regular, circular, and oval papules of a red color, with a depression in their center, resembling syphilitic patches. These papules, some of which are isolated, are, however, for the most part acuminate, and form broad patches, regular in shape, with scalloped borders.

The same lesions are in the inguino-crural folds, a little more numerous on the left than on the right side. Upon the internal surface of the thighs, on a level with the folds formed by the skin, there exist on both sides similar lesions having the same characteristics as those found upon the vulva. There was nothing the matter with the mouth, and no lesions upon the face, the palms of the hands, or soles of the feet. There was no coryza, the liver was not large, nor were there any lesions of the viscera.

In the discussion which followed, extreme doubt was cast by both MM. Vidal and Fournier upon the syphilitic character of these lesions, and it was suggested that the lesions should be treated locally with Labarraque's solution and dusted with some inert powder. This was done, and the child was shown again on March 14th, seven days later, and the lesions had entirely healed up under the application of powdered starch and a careful isolation of the morbid surfaces. From this it would be exceedingly doubtful whether the lesions shown by M. Besnier were really syphilitic. It was probably one of those cases of vaccineiform herpes, perhaps associated with eczema, not infrequently seen in children.

Course.—Miliary papular eruptions, although not particularly obstinate, do not disappear as readily as does the macular variety. It is slow in being absorbed, and leaves a stain behind which lasts for some little while after the eruption proper is gone. The lenticular (the broad kind), on the other hand, is very slow in disappearing, is rebellious to any but the most energetic treatment, and is quite prone to relapse. The infiltra-

tion of the submucous layer is oftentimes extensive and obstinate, and this eruption is the dividing line between the preceding mild lesions and those of a later or more advanced type; for it must be borne in mind that the manifestations of the hereditary late variety are essentially those of the late ulcerating kind (the so-called tertiary stage), which are seen in the acquired type, and betoken an advanced condition of the disease. These lesions are true gummous deposits, and are often exceedingly destructive in their course.

In the majority of cases, in the early stage of the disease, the child recovers from any active manifestations of syphilis for a time, provided the treatment has been efficient and prompt. This period of exemption may last for two or more years, until the age of five or six years is reached, when a relapse of a papular syphilide takes place, or else the next step is taken in the onward course of the disease, to wit, the pustular variety. This variety is most frequently to be seen about the face, the hairy scalp, the soles of the feet, the palms of the hands, and the legs. The lesions begin as small nodules beneath the surface of the skin, which quickly become raised above the surface, are filled with pus, which dries in the form of scabs, and these, becoming detached, leave an ulcerated surface beneath. When they make their appearance they denote a tendency toward the development of later lesions, and betoken an outbreak at the age of puberty, even if the child survive the present attack.

Late Syphilides.—These are the symptoms which occur upon the skin during the early stage of infantile syphilis; but there is one variety to which I shall call attention later, viz., the kind known as the hæmorrhagic variety. Before describing that, let us study the eruptions which take place during the stage known as *syphilis hereditaria tarda*. We now arrive at the late stage, or the period known as the tertiary, where the lesions begin in the deeper layers of the skin or cellular tissue, and are gummous in their nature. These are the types very often spoken of and written about as syphilitic lupus—a most unfortunate name. They are not so widely diffused over the body as the lesions just described, but are usually confined to certain portions. Fournier (*Annales de Dermatologie et de Syphiligraphie*, 1886) gives the seat of these lesions in fifty-three cases. In twenty-eight they occurred on the face; in one they occurred on the hairy scalp; in twenty-seven they occurred on the leg; in five they occurred on the buttock; in two they occurred on the foot; in five they occurred on the arm; in four they occurred on the forearm; in three they occurred on the hand; in six they occurred on the trunk; in one they occurred on the neck; in one they occurred on the breast; in three they occurred on the thighs; in four they occurred on the face; in three they occurred on the vulva; and in one case they occurred in the aperture of the anus.

Although it is seen that these lesions are found on all parts of the body, there seem to be certain spots where they are more frequently met with than upon others.

The face is the special seat of predilection, after that the legs; and Fournier calls attention to the fact that it is the anterior portion of the leg which is most frequently attacked. When the face is attacked, he says the nose is the seat of predilection, and I should add the cheeks, for, so far as my experience goes, the cheeks are as frequently attacked as the nose, either concomitantly or alone. Fournier, however, says the nose is the seat of predilection, and out of twenty-eight cases where the face was attacked, the nose was the favorite seat in eighteen, and was severely attacked. These are the cases so often considered as lupus, and reported as cases of lupus cured by the use of the iodide of potassium.

Course.—The advent and progress of these lesions are noteworthy as coming on slowly and insiduously, without pain, or any premonitory symptoms. They begin as tubercles, or groups of tubercles, deeply seated in the cellular tissue, which break down, often after long duration, and present open ulcerations, or else are covered with adherent crusts, which, when removed, show deep ulcerations beneath. These ulcerations extend in a serpiginous manner, cicatrizing at one point and extending at another, and refuse to heal up under the usual methods of treatment directed toward the cure of lupus, or rodent ulcer. Iodide of potassium is the only thing which seems to be of benefit. The course of these lesions is essentially a slow one. When they heal they always leave a cicatrix behind them, which is depressed beneath the surface of the surrounding tissues, and is usually recognizable as due to syphilis.

Another variety remains to be spoken of, one which has been described by many authors (Smith, Jenkins, Von Barenprung, Epstein, Ritter, Petersen, *et al.*) under the name of *syphilis hæmorrhagica neonatorum*. This variety of eruption usually occurs early in the life of the child, often at birth or very shortly after, and is associated with other evidences of profound poisoning from syphilis. It may be accompanied by pemphigus, in which cases the bullæ are filled with a bloody serum, or it appears as hæmorrhagic effusions beneath the skin. This may occur as isolated points or as a diffuse purpura, and is accompanied by bleeding from the umbilicus, hæmorrhage from the nose or mouth, and bloody stools due to hæmorrhage from the intestines. Associated with this lesion, gummy infiltrations of the viscera, of the liver, spleen, and lungs, are found upon autopsy. The infants succumb under the loss of blood and the depressing effects of the syphilis.

Mraček (Berliner Klinische Wochenschrift, 1886) gives the history of nineteen cases of this kind, in which all the children died at periods varying from half an hour to forty-eight hours. On autopsy, vascular lesions

were found in the viscera, with sanguineous effusions (Mraček, Viertelj. f. Derm., etc., 1887).

Richards (Indian Medical Gazette, 1884) records a case of gangrene of the forearm occurring as the result of hereditary syphilis; but I regret that I have been unable to verify this case of Richards by reference to the journal in which the report appeared, and so I merely quote it as having occurred.

Zantiotis (Gazette Hebdomadaire de Médecine de Paris) gives an account of two cases of subcutaneous phlegmon as resulting from hereditary syphilis, which are very interesting.

In the first case the child was born on the 15th of June, 1885. On the 2d of July it broke out with an eruption of pustules, and at the same time the left arm became red and swollen. On the 5th of July, at the lower and internal aspect of the arm, near the articulation of the elbow, an abscess formed, which broke spontaneously.

On the 6th of July, Zantiotis saw the child. Its physical condition was fair. There was an ulcer the size of a two-franc piece at the site of the abscess (a little larger than a quarter of a dollar). The tubercular process was laid bare, but was not serious, and pus flowed from the undermined integuments. On the body were vesicles, papules, pustules, and tubercles, but none on the face or ears.

On the 8th of July a second brachial abscess appeared, which was opened and gave vent to laudable pus. From that date forward fifty abscesses, varying in size, broke out over the body and head, and were finally cured, as were the cutaneous lesions, by antisyphilitic treatment. (The parents denied having had syphilis.)

The second case was similar to the one just given, except that it terminated fatally, and unfortunately no autopsy could be obtained.

AFFECTIONS OF THE MUCOUS MEMBRANE.

The mucous membranes of children, the subjects of inherited syphilis, are attacked in a manner similar to the affections of the skin; the division being made between those affections occurring early in the course of the disease (shortly after birth), and those which occur during the later stage, known as *syphilis hereditaria tarda*. During the earlier stages, if the child be born with evidences of the disease, the affections of the mucous membrane correspond closely to the lesions found upon the skin.

If the child be born with pemphigus, the mucous membranes show a loss of their epithelial covering. They have a red floor, with but slight, if any, ulceration. This condition is usually seen upon the mucous membranes of the tongue, mouth, fauces, and even far down in the pharynx, producing difficulty of respiration and more or less alteration of the voice. If the disease has not progressed so far, and the child is born with a

papular or papulo-pustular eruption, the mucous membrane of the buccal and faucial cavities show ulcerations, from which the epithelium has been stripped, with edges more or less excavated and a grayish or yellowish-gray floor.

The child's voice becomes husky and stridulous, respiration is impeded and deglutition difficult. The less advanced the disease is the less marked are these symptoms, and in those children in whom no symptoms occur at birth, the mucous membranes of the mouth, throat, and tongue present no lesions whatever. But later on cutaneous manifestations make their appearance, slight abrasions are found upon the lips, the tongue, and about the angles of the mouth, which invade the skin, producing the fissures which are of such frequent occurrence in cases of infantile syphilis. These usually come on slowly, and the first thing which calls the physician's attention to the child's condition is a difficulty in breathing and an alteration in the voice, which is peculiar to this disease, and once heard can never be mistaken for anything else. The child refuses to nurse as readily as heretofore, and, when nursing, experiences more or less difficulty in seizing the nipple, owing to the irritation produced by these mucous patches of the mouth and lips. Concomitant with these symptoms, or appearing shortly after them, the nasal mucous membrane becomes affected. A thin, ichorous discharge, rapidly becoming purulent, flows from the nose, which upon exposure to the air becomes dry and forms crusts. When these crusts are removed, superficial excoriations and ulcerations are found beneath.

This condition goes on until the child, exhausted by its efforts at respiration, becomes worn out and sinks from marasmus, or malnutrition in consequence of lesions occurring in the stomach, in the intestinal tract, or in the larger viscera of the body.

If the child under treatment survives this attack and lives through the first four or five years of extra-uterine life, it begins later on to show more or less pronounced ulcerations of the throat and of the posterior nasal cavities in the shape either of a chronic catarrh or of an infiltration of the soft parts, resulting in ulceration and destruction of tissue.

These changes come on slowly, are attended with very little physical pain, and are only noticeable from the impediment to respiration or deglutition which occurs; but the lesions rapidly break down, and when this happens, as is frequently the case in the soft palate, on the anterior fauces, or upon the posterior pharyngeal walls, the results are deep-seated ulcerations, great loss of tissue, and destruction of important parts.

When the ulcers heal up they produce oftentimes important modifications of these organs, going so far as to cause stenosis of the posterior nasal cavities and of the pharynx. These are the cases which, among the older writers, were considered as strumous ulcerations which failed to heal

up except under the administration of the iodide of potassium or small doses of mercury ; and it is curious, in this connection, to remark that such a careful observer as Sir Astley Cooper noticed this fact without ascribing it to its true cause ; and the famous sirup which in the last century went by his name, owed its efficacy to the fact that mercury was one of the principal ingredients in its composition.

As the child becomes older it may present no further evidences of syphilis until the age of puberty is reached. Then a recurrence of the previous symptoms may take place, or else the disease progresses to a later stage, in which not only the mucous membrane covering the hard parts, such as the hard palate and the gums, may be attacked, but the periosteum also becomes involved ; this point, however, is referred to elsewhere. When the mucous membrane covering the hard palate or the gums is attacked, it usually commences as an infiltration of the parts, attended with no signs of inflammation or pain. It becomes detached from the bone, and usually develops superficial ulcerations which are quite extensive, leaving the bone covered with its periosteum beneath. It is very rare, however, that only the mucous membrane is invaded, for in nearly all these cases it is accompanied with periostitis, which leaves denuded bone beneath it as soon as ulceration ensues. Coincident with these lesions periostitis of the nasal bones ensues, which, after necrosis, causes sinking in of these bones and flattening of the nose.

The mucous membrane of the pharynx and larynx is frequently attacked as far as the bronchi, and even the smaller bronchial ramifications of the lungs, as well as the mucous membrane of the stomach. These commence first in the form of catarrh of the bronchial tubes, producing what is often known under the vague term of *syphilitic catarrhal bronchitis*. The symptoms which occur in this variety of bronchitis are those which occur in bronchitis apart from this cause, to wit, increased expectoration, some dyspnoea, and but very slight, if any, cough. Fever is usually absent. The remedies generally given for the relief of ordinary bronchitis in these cases seem to be of little avail, and iodide of potassium is the only remedy that is of any service.

AFFECTIONS OF THE LYMPHATICS AND GLANDS.

One set of organs in hereditary syphilis has received but slight attention until within the last few years, and that is the affections of the lymphatics, not only the superficial but the deep vessels. These were first spoken of in 1804 by Lamauve in his edition of Mahon, *Traité des Maladies Syphilitiques des Femmes en Couche et des Nouveau-Nés*, in which, when describing syphilis of children, he speaks of an engorgement of the lymphatics.

In 1810, Bertin (*Traité des Maladies Vénériennes chez les Nouveau-*

Nés, etc.) described an inguinal lymphangitis in children who are the subjects of inherited syphilis where the symptoms occurred sometimes after the disappearance of other lesions. The glands are indurated, and resemble scrofulous engorgement.

Hutchinson (Medical Times and Gazette, 1858) reported the case of a syphilitic child in whom the bronchial glands were infiltrated with fibrous deposits similar to those found in acquired syphilis.

Von Bärensprung, in his work (Die hereditäre Syphilis, 1860) *passim*, describes an enlargement of the mesenteric glands, and of the glands about the spleen and the broad ligament of the liver.

Mollière (Annales de Dermatologie et de Syphiligraphie, 1870) gives an account of enlargement of the inguinal, the prevertebral, and the mediastinal glands in the syphilitic child; Casati, of Milan, Campana, of Naples, Rivington, Lancereaux, Lasehewitch, and Doyen have also called attention to this condition of the glands in hereditary syphilis. The latter, in the Archives Générales de Médecine, gives the record of eight cases of inherited syphilis, in four of which lymphatic enlargements were observed.

The glands involved were the mesentery, lumbar, iliac, hypogastric, inguinal, thoracic, mediastinal, axillary, and carotid—in fact, all the abdominal and thoracic glands. Their tissue was hypertrophied, and they were of a grayish or yellowish-white appearance, and under the microscope were found to be infiltrated with cells of a yellowish or grayish-white hue. In no case, so far as I am aware, has there been any actual breaking down of the tissue, except where the glands lie superficially and close beneath the integument.

The *thymus gland* is the one to which most attention has been called in this variety of disease, and although Paul Dubois is the one generally credited with having first called attention to it in 1850, it really was observed twenty-five years earlier, in 1825, by Cruveilhier and Veron.

The latter writers, however, merely called attention to the enlargement of this body in cases of hereditary syphilis. Dubois was the first one to describe it *in extenso*.

Frequently this gland is found of normal size and not differing externally from a healthy gland, but upon slight pressure it exudes a yellowish-white, viscid, semifluid, alkaline substance, which under the microscope shows abundance of pus-cells. Upon section, the tissue of the gland is found to be denser than normal, with scattered deposits of fibrinous exudation.

These exudations may be diffused generally throughout the substance of the organ, or they may be circumscribed into deposits varying from the size of a bean to that of an English walnut.

If the organ is infiltrated throughout its substance, the exudation

which takes place is that described above, as of a yellowish-white, viscid fluid.

When it is circumscribed, however, the infiltrations usually break down in the form of gummons infiltrations, or else as abscesses, which under the microscope show increased cell growth with abundance of pus-cells.

AFFECTIONS OF THE NAILS.

Onychia in inherited syphilis appears in two forms. The first, which comes on early in the course of the disease, consists in an inflammation of the matrix, is associated with the early cutaneous lesions about the nail, and rarely becomes pustular. The second occurs later on, and is a genuine ulceration of the matrix, or it may begin at the side of the nail, which is altered in texture, becomes raised, with destruction of its bed. Sometimes this process is repeated several times before a new nail is finally reproduced, which is often of irregular growth and misshapen.

Mr. Stephen Paget (*Lancet*, February 2, 1889) showed a case of disease of the nails in inherited syphilis similar to what is figured by Mr. Hutchinson in his *Clinical Manual on Syphilis*. All the nails were affected, hands and feet alike; they were thickened, discolored, and pinched. Some were already shed. The posterior part of each nail was of a yellow tint, but there was no discharge from under them, no blisters around them. The baby, four months old, was the first living child after two miscarriages, and had suffered from sores at the anus and a papular rash on the chest. There had been snuffles, but no history of sore mouth. A slight attack of pemphigus and some exfoliation of skin had been noticed. It rapidly improved under treatment.

Another singular affection of the nail is of the dry variety, and is described by Van Harlingen (*Philadelphia Medical News*, 1883), in which the nails of the fingers and toes were implicated. The case is that of an infant, the subject of congenital syphilis, in whom, when three weeks old, the nails began to show a yellow discoloration in the center, and to take on an arched shape as if shrinking together from the side. The nails of the feet were affected first, later on those of the hands.

Examination showed the nails of both fingers and toes to be alike affected, being partly curled in on their lateral edge, until they occupied less than half, or scarcely even one third, of the entire width of the nail-bed. Growing out some distance beyond the ends of the fingers and toes, the nails bent over in a clawlike shape so as to resemble the claws of a duck or other animal—a resemblance made stronger by the dark, brownish discoloration of the nails.

The surface of the contracted portion was furrowed by fine, transverse markings, while the proximal portion of the nail-bed from which it sprung is thrown up into rugous folds. The nail-bed alongside the con-

tracted nail was somewhat ruffled and slightly brownish. The diseased nails were not thickened and were not in any way misshapen, except for the perfectly uniform changes which are described, which involved all the nails in precisely the same manner.

Diday, in his work, *Syphilis des Nouveau-Nés*, quotes Guérard (*Journal de Siebold*, T. X.) as follows: "I have seen, in the newborn child affected with syphilis, the nails of the hands and feet gradually become atrophied, grow longer and narrower in appearance, falling off at last to make way for more healthy nails, which underwent the same process; and this happened three times in succession before really sound nails remained.

ALOPECIA.

Alopecia is another affection of the appendages of the skin, which occurs in the heredo-syphilitic child, and is of two kinds. The one takes place early in extra-uterine life; the other, with the manifestations of the late variety. The first kind is general, attacking the hair of the head and eyebrows, which are scanty and readily fall out, leaving the child bereft of hair, or else the hair fails to grow readily as it should.

The second variety is either complete, or, as is most frequently the case, confined to certain portions of the head, occupying the fronto-parietal regions, showing itself in bands more or less extensive in the antero-posterior direction. It is seldom seen on the vertex, either frontal or occipital. In bad cases the eyebrows are scanty, sometimes entirely wanting. This form of alopecia is sometimes attended by epithelial pigmentations. Mercurial treatment will arrest the progress of the baldness, but it will not renew the growth of the hair. The seat and extent of the baldness distinguish it from other forms of alopecia which occur in children.

AFFECTIONS OF THE GENITAL ORGANS.

The Testicles.—Affections of the testicles in inherited syphilis have been described by Henoeh (*Deutsche Zeitschrift für praktische Medizin*, 1877), and by Hutinel (*Revue Mensuelle de Médecine et Chirurgie*, 1878), in which the testicle was enlarged, hard, and painless. Infiltration occurs in the body of the testis as a rule, and not in the epididymis. This nearly always escapes; but an interesting case of exception is reported by Comby (*Annales de Dermatologie et de Syphiligraphie*, 1889), to which I shall refer further on.

In the seven cases observed by Henoeh, four showed lesions of both testes, and in three the left one only was affected; the children ranged from three months to two and a half years old.

The infiltration commences about the periphery of the arterioles of the testis, and is followed by increased cell-formation and general infiltra-

tion of the organ. This is more common in the circumscribed variety, which appears in the form of small nodules set in the body of the testis, and which usually indicate fatty and granular degeneration.

In the diffuse variety the seminiferous tubules disappear by compression, and the whole organ is converted into a hard, fibrinous mass; the progress of the disease seems to be divided into three stages: first, an exudation about the vessels; second, an infiltration and thickening of the interstitial tissue; and, third, strangulation and obliteration of the seminiferous tubules.

The case of *syphilitic epididymitis* mentioned above, as reported by Comby, is so interesting that I shall give it here in full:

At the Clinique des Médecins de l'Hôpital St. Louis, in April, 1889 (Annales de Dermatologie, etc., for the same year), M. Comby presented a small boy, aged six weeks, who for five or six days previously had shown an abundant eruption occupying the forehead, the circumference of the nates, the anal region, the thighs, and other portions of the body. This eruption was composed of circular papules, which were for the most part eroded, and presented the most typical example of mucous patches of the papulo-erosive variety of syphilis. Moreover, on examining the testicles of this child the left one was found perfectly healthy, but the right one was augmented in size, especially at the epididymis, which was large, nodulated, and hard.

The mother of the child, aged twenty-four years, is healthy, and declares that she has never had syphilis. The father, aged twenty-six years, gives a history which admits of no doubt. The treatment prescribed was daily inunctions of mercurial ointment, together with sublimate of mercury baths, and later the sirop de Gibert.*

In the discussion which followed, M. Fournier considered the case of extreme interest, inasmuch as it demonstrated that the epididymis, to the exclusion of the gland itself, could be the seat of syphilitic lesions of congenital origin. Up to the present time only lesions of the body of the testicle had been noticed in heredo-syphilitic sarcocele.

Affections of the testis, apart from syphilis and tuberculosis, are so rare in children that when they occur they may be always ascribed to either of these two causes; and in syphilis the infiltration which occurs, the enlargement of the testis proper, the rarity with which the infiltration breaks down, and its slow course, mark pretty clearly the dividing line between these two affections.

The penis in grown-up subjects of inherited syphilis is often found small and undeveloped in size, and the growth of hair upon the pubes is

* The sirop de Gibert is made up of the biniodide of mercury, the iodide of potassium, simple sirup, and water.

scanty. There is feeble virility, and the seminal fluid is found to be either wanting in spermatozoa or else they are very few.

In women the arrest of development is quite as marked. The genitals are in an undeveloped condition, the mons veneris is scantily furnished with hair, the vagina is small and narrow, rather resembling the vagina of a young girl than a grown-up woman, and menstruation is much delayed; indeed, is sometimes absent, as in the case reported by Lance-reaux (*Traité de la Syphilis*).

The patient, a woman of forty-one years of age, never menstruated, and at the autopsy the following condition of things was found:

The genital organs were not more developed than those of a girl of ten years old. The ovaries were rudimentary and showed no Graafian vesicles, and the vagina was so narrow as to have rendered sexual intercourse a physical impossibility.

In cases where menstruation is never established, the uterus is found to be in a rudimentary condition, and where the ovaries are undeveloped we need look no further for the cause of the absence of the catamenia. The ovaries are sometimes attacked with subacute inflammation, as has been described by Parrot.

In common with the rest of the genital organs, the *mammæ* also share in the lack of development. Schwimmer gives the details of one case in which the *mammæ* were scarcely developed, the genital organs were completely atrophied, the mons veneris was almost devoid of hair, the hymen was intact, and the vagina was very narrow, scarcely admitting the finger. The patient presented the appearance of a girl of fourteen. The catamenia, in this case, were said to have appeared only once, at the age of twenty-one.

DIAGNOSIS, PROGNOSIS, AND TREATMENT OF HEREDITARY SYPHILIS.

Diagnosis.—The diagnosis in cases of congenital and hereditary syphilis may be divided into two groups, those pertaining to the earlier stages, which are exhibited during infancy, and those of the late stage, which are exhibited during childhood, together with early and late adult life. In each of these the diagnostic points differ very materially.

Oftentimes at birth, or during the first few months of the infant's life, no symptoms whatever of the disease may be apparent. The child is born, to all outward appearances, perfectly healthy; but after a few months, in the larger proportion of cases before the lapse of six months, the child begins to show signs of ill health, loses flesh and strength, becomes peevish and irritable, and oftentimes refuses to nurse. Shortly afterward an eruption makes its appearance on the body, which is sometimes macular, sometimes maculo-papular; at the same time the child's cry differs from its usual healthy sound, becoming hoarse, rasping, and uncer-

tain ; and if an examination of the mouth and upper part of the fauces be made, the mucous membrane covering these parts is found to be the seat of opalescent exudations, which sometimes break down and become converted into superficial ulcerations. At the same time the nose exudes a thin, ichorous, highly irritating discharge, which, on exposure to the air, dries in the form of thin, yellowish or brownish crusts. The eruption, in its earlier stage, covers the entire body as well as the face, and is of a pink or reddish color, which rapidly becomes covered with thin, fine scales. Upon those portions of the body, when the skin is thin, especially about the axillæ, the genito-crural folds, the cleft of the nates, and popliteal spaces, these maculo-papules become moist, secreting a thin fluid, and are not covered with scales. These secreting papules are known under the name of mucous papules of the skin, and are akin to similar lesions which occur upon the mucous membrane of the mouth and throat.

Coneomitant with this form of eruption, or immediately following it, bullous eruptions occur on the palms of the hands and soles of the feet, and the bullæ, at first filled with a thin, serous fluid, rapidly become purulent, coalesce, and attain to an enormous size. This is the so-called *pemphigus syphiliticus neonatorum*, a form of disease which may sometimes be apparent at the birth of the child. Under treatment, these lesions yield rapidly, providing they have come on some time after birth, and then the child may enjoy for several months entire immunity from syphilitic manifestations. If, as sometimes happens, the child is born with evidences of its disease, the lesions most apparent are those of the bullous variety ; and associated with these bullæ are lesions of the internal organs, the lungs, the liver, the kidneys, or the spleen, which belong to a more advanced type of the disease, and which nearly always proves fatal to the newborn child.

Associated with these external lesions, the appearance of the child indicates important and curious modifications. It loses its usual healthy appearance ; it no longer presents the full, robust aspect of a healthy child, but becomes emaciated and wizened, having the appearance of premature senility, at the same time exhibiting curious fissures around the angles of the mouth, due to the presence of mucous patches of the cheek or secreting papules of the chin. Care must be taken, in making the diagnosis of these various lesions of the skin, not to mistake them for cases of simple eczema, or for symptoms resulting from defective nutrition, dirt, and bad hygienic surroundings. Besnier (Bulletin Médicale, 1887) has called attention to lesions occurring in infants which, while not syphilitic, bore a close resemblance to the syphilides, and cites one case which is extremely interesting, and the details of which are as follows :

The case is that of twins a few weeks old, who were nursed by their mother in part and partially brought up on the bottle. They presented

the appearance of senility, were emaciated, cachectic, and showed upon the tongue, the lips, and the ano-genito-crural folds erythematous lesions with multiple excoriations. The mother, herself of sickly appearance, was the possessor of a semilunar fissure of the breast, and had in the axilla of the same side upon which the fissure was seated a movable and indolent glandular enlargement. Besnier showed that these lesions, both in the children and the mother, were not syphilitic. In the children the labio-buccal lesions were not elevated, as is the case in the syphilitic lesions. Their base was erythematous; there was no evidence of a proliferation; they were seated only on the tongue and the lips, and were the same in point of position in both children. The nostrils, nasal fossæ, naso-labial commissures, and the eyelids were intact.

These lesions were due to neglect, to a lack of cleanliness, and to the fact that the milk used in the nursing bottle had become altered by fermentation. The lesions of the genito-crural folds and about the anus were due also to a lack of cleanliness, and were more of the character of erythema intertrigo than of true syphilides. The mother's lesions, Besnier showed, were not syphilitic: first, because when this fissure appeared on the breast the children were already suffering from the buccal lesions which had been described; second, she had had similar symptoms when she had nursed other children; and, third, the appearance of the fissure resembled what is seen in eczema of nursing women, and did not look like a chancre of the breast.

Acting upon the belief that these were not syphilitic lesions, Besnier instituted an exclusively local treatment, consisting of cleanliness, disinfection of all napkins used by the children, cleansing the lesions in both the mother and children with borated water, dressing the ulcerations with a five-per-cent borated preparation of vaseline, and instructing the mother as to the quality and quantity of the milk to be given to the children. In eight days a cure of all the symptoms in both mother and children took place.

This case serves to show that lesions may occur in children, which, so far as their general appearance is concerned, very closely resemble syphilides, and which may mislead the surgeon, unless care and attention are given in the examination, and in the history of both children and mother; they yield to local treatment, and have nothing at all to do with syphilis.

When the lesions are due to syphilis, if the treatment be efficient, these lesions, as a rule, entirely disappear, and the child's general condition improves, so that it regains a fair amount of health, which may last for several months, to be followed later on by a return of the cutaneous or mucous symptoms, or by a more advanced stage of the disease.

One point should be carefully borne in mind, and that is, that the

earlier lesions may entirely disappear and leave no trace behind them; so that if subsequent manifestations at the age of puberty, or even later, occur, they may be mistaken for the first symptoms of the disease, and the case is then regarded as one in which the syphilitic manifestations did not take place until several years after birth. This view, in my opinion, is a mistaken one, for I believe, in all cases where the later lesions occur, earlier manifestations have been present which have entirely disappeared, and that the late lesions were not the first ones. I am inclined to think that all lesions which occur after the first five years of an infant's life should be classed among those of a late type, for the earlier lesions always make their appearance within that length of time; and, indeed, in the larger proportion of cases, within the first twelve months.

The symptoms which have been classed together under the name of *syphilis hereditaria tarda* are those which in the acquired type would be characterized as the late or so-called tertiary syphilis, viz., diseases of the eye and ear, diseases of the teeth, diseases of the bones, of the nervous system, and ulcerating lesions of the skin and mucous membranes. To present a typical picture of a person who is the subject of inherited syphilis, I can not do better than quote the words of Augagneur (*Étude sur la Syphilis Héritaire Tardive*):

“Had I in a few words to present the ideal, clinical type of late hereditary syphilis, I should select a young girl, eighteen or twenty years old, whose eyes should present traces of parenchymatous keratitis; the teeth should be eroded and crescentically notched, at the same time they should be small and irregular; the hearing should be partially or totally lost in consequence of frequent attacks of otorrhœa; the genitals, possessing all the attributes of virginity, should be small; the mons veneris and the axillæ should be smooth; the mamæ without prominence; and menstruation should scarcely be established. Add to these all the tertiary lesions you please, and you will have before you a complete picture of late hereditary syphilis. . . . To the trilogy of Hutchinson—interstitial keratitis, defective incisors, and otorrhœa—I propose to add two other signs: general congenital atrophy and general arrest of development.”

It is this peculiar arrest of development, conjoined, of course, with other symptoms, which serves to attract the surgeon's attention to the character of the lesions which may be presented to him, whether they be of the skin, the bones, or the nervous system. The patients nearly always present the appearance of being much younger than they really are, so far as stature, mental power, and physical development are concerned; and when, in addition to these, the appearance of the teeth or lesions of the eye are taken into consideration, the surgeon may often arrive at a tolerably accurate diagnosis, notwithstanding the absence of all previous syphilitic history, either in the individual himself or in his parents. As I

have already pointed out, no single lesion can well be depended upon absolutely in making a diagnosis, but the surgeon should take all the symptoms together, and notably those which point toward a defect in or arrest of development. In some cases, however, the patients may present no signs whatever of an arrest of development. They may, on the contrary, be of good growth, of fair mental power, and, so far as their general appearance is concerned, may not lead the surgeon to suspect inherited syphilis. The character of the lesions themselves, then, may in the main be depended upon; and if they belong, as they nearly always will, to a late or an advanced type of the disease, the question may be fairly entertained whether the lesions are not those of an acquired rather than a hereditary type; and it is upon this point I wish to call more particular attention. A robust patient may come under the surgeon's observation for some ulcerating lesion of the skin, some necrosis of the bones, or some affections of the testicles, which the surgeon, if left to himself, would be inclined to ascribe to the acquired type of the disease, were it not for the fact that the patient denies absolutely having contracted syphilis at all. So far as the appearance of the patient is concerned, there is nothing to induce the surgeon to positively decide in favor of hereditary disease; and if in cases where symptoms to which attention has been called are absent, I think the surgeon is justified in regarding the case as one of acquired rather than hereditary type. And it is in just such a case as this, where all evidence of an arrest of development is entirely absent, that the surgeon should be justified in rejecting the idea of hereditary syphilis.

Prognosis.—The prognosis in cases of inherited syphilis is generally bad for two reasons: first, because the larger proportion of children born with this disease die within the first year of extra-uterine life; and, second, because those who survive until puberty are debilitated and readily succumb, if not to their inherited disease, to intercurrent affections, which under ordinary circumstances would not prove fatal.

The table on page 631, containing the records of the births of syphilitic children at the Moscow Hospital in Russia, from 1860 to 1870 inclusive, with deaths from that cause, shows how deadly the disease is in children.

From those statistics it will be seen that the highest percentage of mortality is eighty-two; the lowest, sixty-three. Calling it, in round numbers, a general average of seventy per cent, it is very evident indeed that inherited syphilis is a fatal disease.

Suppose that the child survives the first ten or twelve years after birth, it then arrives at a period where it is peculiarly open to attack from the symptoms of inherited disease of a serious nature, such as the lesions of internal organs, of the lungs, kidneys, and liver, or from exhaustion

consequent upon attacks of ulceration of the bones, or of hemiplegia and paraplegia; and, even supposing the child to be fortunate enough to recover from these symptoms, if it be affected with intercurrent disease, the chances of recovery are very small, because its powers of resistance have been continually undermined by the destructive tendencies of its inherited disease. Hence, it may be said that the prognosis in cases of inherited syphilis is bad, and that probably very few children born with this disease survive beyond the period of puberty.

Treatment.—Various methods of treatment have been instituted for the relief and cure of inherited syphilis, and they may be divided into two broad groups—indirect and direct treatment. The first consists in the introduction of remedies into the child's stomach through the medium of the milk of the mother or nurse; and the second, where the drug is given to the child directly by the mouth or through the skin.

The *indirect method* is usually employed in this manner: The nurse or the mother is put upon an active mercurial treatment, under the belief that a certain proportion of the drug will be eliminated through the milk, and that in this way the child will be able to receive its medicine in sufficient amount to bring about a cure. But an examination of the milk of persons who have been treated, even up to the point of salivation, shows that but little, if any, of the mineral is excreted through the milk, and children who have been put upon this method of cure have received scarcely any benefit. As regards this method of treatment, therefore, we may say that it is of no practical value, and should never be resorted to where other and more efficient means can be adopted.

The *direct method* is the only one that offers a fair chance for the child's recovery, and it may be instituted in one of two ways—either by administering the drug to the child through the mouth, or by the medium of the skin. Of these two methods the administration by the skin is the one to be preferred, and the plan most worthy of adoption is to spread from one to two drachms of mercurial ointment upon a cloth, which shall be bound around the child's body, and should extend from the axillæ to the hips, care being taken that the axillary and genito-crural folds shall not be irritated by the mercurial ointment. This should be worn by the child for two or three days, when it should be removed, and the child's skin gently washed with warm water and soap. A fresh supply of ointment should be applied to the same cloth, which is then again bound upon the body of the child. This is better than making innuitions upon the child's trunk, or upon the limbs, as it is less likely to produce eczema, or to irritate the skin; the warmth of the child's body causes rapid absorption of the drug; it does not interfere with the child's nursing, nor is it so apt to derange the stomach or intestines, as is the case when the drug is given internally. It must be borne in mind that syphilitic children

generally tolerate mercury very well, and will take quite large amounts without showing any of the deleterious effects of the drug.

If it should be considered advisable to give mercury by the mouth, it may be administered either as a powder—the ordinary pulvis hydrargyri eum eretâ—which may be deposited upon the child's tongue, and will readily be taken up, or it may be given in the form of the bichloride, in doses of from one one-hundredth to one fiftieth of a grain, rubbed up with sugar of milk, or administered in sweetened water or milk and water. The powdered preparations are far the best. Sublimate baths are sometimes administered, but the effect is frequently to produce debility, and they must consequently be used with caution in the case of infants and young children.

Hypodermic medication, in the treatment of infantile syphilis, has been suggested and used by some syphilographers, but it is not to be advised on account of its producing severe pain, besides serious and sometimes alarming abscesses. In addition, the treatment by the hypodermic method is longer and more uncertain than the injection or other methods, and it presents no advantages which would recommend its use in preference to the forms of medication already suggested.

In the earlier months of treatment iodide of potassium is seldom, if ever, called for, and its administration should be reserved for lesions of a later type, more especially those of the ulcerative variety.

Under this method of treatment the child will often recover from its earlier symptoms, especially if they have been of a mild type; and even in cases where the lesions are tolerably severe, a proper and thorough course of mercurials directly administered offers the best chance for recovery. In the lesions of the late type, iodide of potassium may be administered, either alone or conjointly with mercury, in the same manner in which it is used for acquired syphilis; and it is in these cases that the iodide of potassium will oftentimes produce the most brilliant and satisfactory results. To be of any service, however, the drug should be given with quite a free hand, for these later lesions of syphilis are oftentimes extremely rebellious, and will not yield to small doses of the salt.

From ten to twenty grains at a dose, large as the amount may seem, are of more service than two, three, or five grain doses. And the surgeon should be prepared to increase the dose as circumstances require it, or to suspend its use if toxicæ symptoms ensue; but, as a rule, syphilitic children and young adults suffering from this type of disease tolerate the iodide of potassium remarkably well.

In addition to this, mercury may be administered either in the form of the protoiodide, which is the one best borne, or of the bichloride; this latter preparation is, however, so often apt to disagree with the stomach, and to produce diarrhoea and other intestinal disturbances, that its use

had better not be resorted to unless the other preparation of mercury, the protoiodide, can not be used.

Local Treatment.—In addition to the constitutional treatment, local treatment will very often be required for the relief and cure of some of the symptoms. In cases where the mouth and tongue are attacked with mucous patches, local applications of a weak solution of nitrate of silver, from one to five grains to the ounce, may be applied daily in the case of infants. As gargles and mouth-washes can not be used in these cases, in addition to the employment of nitrate of silver, the lesions may be lightly penciled over with a preparation of tannin and glycerin, in the proportion of ten grains to the ounce, or with a weak solution of sulphate of zinc, one to three grains to the ounce of water. This should be done several times during the day, and the infant's mouth kept as clean as possible. In excoriations and ulcerations of the nasal fossæ, the same methods may be employed as are used in lesions of the mouth and tongue. In cases where ulcerations are present on the body, if there be no sign of the extension of the ulceration beneath the crust which covers it, it is better, perhaps, to leave the crust in position, as it makes the best dressing for the ulceration beneath; but if there be any signs of extension, the crust should be gently detached by poulticing or by soaking in warm water, and the ulcerations themselves touched with a weak solution of nitrate of silver, of the strength above advised, and dressed with a mercurial ointment diluted with an equal proportion of vaseline.

In cases of pemphigus the bullæ should be emptied of their contents, and if the epidermis covering them has become detached, they should also be dressed with the diluted mercurial ointment; but, as a rule, very little local treatment will be required for these lesions, the bullæ being seldom attended with much, if any, ulceration. Lesions about the genito-erural fold and the anus should be kept clean and dry. They should be repeatedly washed, and the napkins which the child uses should be frequently changed. After the parts have been washed and thoroughly dried they should be freely powdered over with calomel and bismuth, in the proportion of one part of calomel to two or three of bismuth, and after each change of the napkins the powder should be gently removed by washing and reapplied. If the mucous patches at this point show signs of ulceration or breaking down, they should be touched gently with a solution of nitrate of silver, in the proportion of five or ten grains to the ounce of water; but in the larger proportion of cases, if the parts are kept clean or dry, very little else is required.

In the later stages of the disease, particularly where ulceration is present, the local treatment oftentimes plays an important part. Where ulceration of the soft palate or of the throat is present, the best application is that of the nitrate of silver, of the strength of twenty or thirty

grains to the ounce, applied every second or third day; and the parts should be frequently gargled with solutions of alum, tannin, sulphate of zinc, or myrrh. This latter, in the dilute form of a drachm to six or eight ounces of water, makes a very good mouth-wash in those cases of ulceration, and will frequently stimulate indolent or foul-looking sores of the mouth or throat. When necrosis of the skin occurs, and there is abundant suppuration, the best method of treatment is by the application of mercurial ointment spread upon kid or cloth and applied directly to the part, care being taken, of course, to keep the wound thoroughly clean by frequent syringing with carbolated or weak bichloride solutions.

Two very important questions in these cases are, How soon should treatment be instituted? and, How long should it be continued? To the first of these the answer is, that treatment should be begun as soon as the symptoms have made their appearance. In a child who, although born of syphilitic parents yet shows no symptoms of the disease, treatment should not be instituted immediately after birth. It is better to wait till some symptoms make their appearance, for two reasons: first, to judge of the severity of the disease; and, second, to prevent the delay of symptoms by the premature-use of mercurials. But as soon, however, as any symptoms have made their appearance, treatment should be instituted at once, and should be continued until all manifestations of the disease have passed away.

This, of course, applies only to those cases where the symptoms of inherited disease are mild at the outset.

When the child is born with manifestations of the disease, and especially if they are of a severe type, prompt and vigorous treatment should be at once instituted; but, generally speaking, in these cases the child succumbs to the severity of the attack before any method of treatment will be of much avail.

In the later inherited stage the treatment should be commenced as soon as any symptoms occur, and should be continued until their entire disappearance. It should then be intermitted, and the child placed upon tonics and carefully watched for several years, in order to see if subsequent symptoms recur; and upon their recurrence treatment should be again renewed and vigorously carried on as long as any symptoms remain.

This intermittent method of treatment is preferable to a continued one of several years, as it prevents the child from becoming accustomed to the remedies, and it also gives the surgeon an opportunity of judging whether the case is likely to progress to recovery, or whether the treatment is merely palliative.

In some cases, in the more advanced types of the disease, both mercury and iodide of potassium seem to lose their effect, and the patient, in-

stead of improving under their administration, loses ground and becomes worse rather than better.

In these instances the treatment by mercury and iodide of potassium should be at once discontinued, and the patient placed upon tonics and restoratives, and everything done to build up the general health. But in these cases little can be done, as they are nearly always attacked with amyloid degeneration of the internal organs, inducing deep-seated cachexia, and nearly always leading to a fatal result—not, perhaps, directly due to the disease, but indirectly from marasmus.

Preventive Treatment.—It is oftentimes important, in addition to the methods of treatment which have been already detailed, to prevent symptoms from extending from the child to those about it, such as to the nurse or to its own relations. Notwithstanding the fact that for many years the contagiousness of some of the symptoms of inherited infantile syphilis was doubted, it is pretty clearly proved at the present day that syphilis may be conveyed from the infant to others by the secretion of its mucous patches, and care should be taken to limit, as far as possible, all sources of danger in this direction. The surgeon should be careful to impress upon the minds of those having the care of the child that absolute cleanliness is an important point in the question of treatment, and that no person should be allowed to kiss the child, nor should the child in any way convey the secretions from its mucous patches to sound and healthy persons. For that reason the napkins used by the infant should be put at once into water containing a solution of bichloride of mercury, and should be washed separately from the rest of the family linen. The child's person should also be kept scrupulously clean by repeated changing of the dressing in cases of ulceration; and everything connected with the local treatment of the child should be reserved entirely for its own use, and should never be employed by the other members of the family.

Should the child be fortunate enough to recover from its symptoms, it should be carefully and constantly watched to see that no fresh symptoms supervene, and the moment they occur they should be at once treated with the same care as at first. If these rules are rigidly adhered to and carefully carried out, symptoms which might be of importance, not only as regards the child but also those about it, may be checked at the outset, and perhaps limited in their course and duration.

Feeding.—In cases of syphilitic children it is often an important question to decide as to the best method of feeding them. Without doubt, the infant's best food is human milk, but in many cases the mother is unable to suckle her child, and the point to be determined is, whether an artificial method of nursing should be adopted, or whether the child should be transferred at once to a wet-nurse. If this latter plan can be adopted, it is, of course, much the better one; but no wet-nurse should be

employed without having the danger of the infection fairly laid before her, and the risks which she runs in assuming the care of such a child. In the majority of cases no sound woman would be willing to run the risk, and it then becomes a question as to the best method for artificially bringing up the child. If it be decided to feed the child by the bottle, the composition of the milk used should be brought as near to that of human milk as possible. It should be used fresh every time, carefully warmed, diluted, and sweetened, and the child should be fed at regular intervals, both during the day and night, in order to secure a sufficient amount of nutriment. The best that can be said for it in these cases is that it is a poor substitute for the natural nutriment of the child, and that in nine cases out of ten it proves of very little service.

DIAGNOSIS AND PROGNOSIS OF SYPHILIS.

BY HERMANN G. KLOTZ, M. D.

Importance of Diagnosis.—In the study of a disease as interesting in all its aspects as syphilis, as fascinating by the variety of its manifestations, and as exasperating by its constant surprises and insidious attacks, as alluring by the glittering appearance of therapeutic results, and as repulsive by some of its forms and by its associations, the physician is liable to overlook one point—the importance of the disease for the patient himself, its humane side, so to speak. Still, there is hardly any other disease which may have such influence upon the entire life of a person, upon business, social, and family relations. In deciding that a person has become infected with syphilis one may feel, if fully conscious of this importance, a solemn responsibility, like a judge pronouncing sentence on a convicted person.

It is true, sex, age, education, refinement of habits, and moral cultivation will greatly affect the impressions on the patient's mind. The one may only give expression to his regret at seeing himself for some time prevented from continuing his dissipations; while another will deplore the loss of the happiness of his life, the bright aspect of which he sees marred by an indelible stain. Ignorance will prevent the one from realizing his position, and moral depravity the other from accepting its responsibilities.

Unfortunately, the large majority of people possess a very vague and obscure knowledge of syphilis, often received from books or pamphlets, which are disseminated by quacks, and other people from improper motives. No wonder, therefore, that many have a greatly exaggerated conception of the malignity of syphilis and of the severity of its effects; extreme and rare consequences, like the eating away of the nose, entire loss of the hair, defacing ulcers, and other disfiguring lesions being accepted as of regular or common occurrence, and almost surely to be expected in every instance. As to contagiousness, the same extreme views will be met with. Wrong ideas are fostered only by the silence on the question, which naturally is observed by the large majority of those who have had personal experience, and by the secrecy with which everybody interested tries to surround his own suffering.

But even cleared of such undeserved aspersions and taken on its own real merits, it can not be denied that syphilis is always an unwelcome companion for the enjoyment of life and an irksome addition to its burdens. This is largely due to the character of the disease itself. Although, as we shall see further on in considering the prognosis, it is not really so dangerous to general health and life as is often supposed, it can not be denied that it may involve considerable pain and suffering, annoyance, expenditure of money, neglect of business interests, loss of time, etc., not to mention the unpleasant experience incidental to treatment, such as bad effects on the stomach and digestive organs from internal medicines, pain from injections, eczema and uncleanliness from inunctions, the detrimental effect of mercury on gums and teeth, etc.

But the chronicity, and even more so the uncertainty, of its duration, are the most embarrassing and most depressing features. Although due to a great extent to our imperfect knowledge of the real nature of syphilis, this uncertainty is the curse of the disease, and will remain so until we shall possess some means to determine without any doubt the presence or absence in the system of the human body of the syphilitic virus—whatever that may be—and of its derivatives. With our present knowledge, an absolute guarantee that no symptoms will ever again occur can not conscientiously be given, and so the unfortunate patient lives on for years under the constant menace of his eternal persecutor, ready to attribute every little ailment to its influence, and constantly on the watch for its manifestations. Under such circumstances even the natural periods of freedom from symptoms or of latency in the course of the disease may become periods of anxiety and torture.

The fact that some of the manifestations of syphilis, like the temporary loss of hair, eruptions on the face and hands, can not be sufficiently well concealed, is another link in the chain of unfortunate circumstances. But in a much higher degree this must be said of the contagiousness of syphilis, which enforces so many precautions and restrictions upon the daily life of those who earnestly endeavor to protect others from the danger of infection. It is, however, the social aspect which renders syphilis so obnoxious, oppressive, and embarrassing. Society, low and high, does not acknowledge syphilis; even when innocently acquired, at best it can be ignored, its name must not be pronounced; but when, nevertheless, it dares force itself into recognition, it is repulsed with often hypocritical indignation and treated with contempt. The unfortunate victim of the disease is therefore almost forced from the start either to sever most of his social relations or to carefully conceal his affliction; precautions rendered necessary by the possibility of contagion, restriction in his mode of living, as drinking, smoking, etc., imposed by hygienic considerations, largely increase the difficulties, but nowhere so much as in family

life. The relations of syphilis to marriage and married life are so well known that it will be sufficient at this place to mention them. Its relations to life insurance but rarely receive the consideration they deserve, although nowadays they largely enter into the private affairs of a great number of people. Most of the companies absolutely refuse insurance to those who are or have been affected with syphilis, others accept them under certain conditions. The diagnosis of syphilis, therefore, either deprives many persons partially or entirely of the benefits of life insurance in the interests of their families or their business associations, or forces them to conceal their affliction, risking to see their policies declared void in case of detection. Besides, to many policies the original declarations made on application are attached; and who would care to leave to his family the confession of having once had syphilis, if it can be avoided?

Enough has been said, I believe, to substantiate the fact that it is not an irrelevant matter for a person to be adjudicated a syphilitic. At the same time, every man or woman really affected with syphilis will be in a much better situation if the diagnosis is made with exact certainty and at the earliest possible time, than if it is not made at all or is left in doubt. In the former case the opportunity is at once given to apply proper treatment and continue the same for a sufficiently long time, and thus avert as far as possible the evil consequences of the infection. Not so in the latter case. Then treatment will either be entirely omitted, or not be followed up with adequate energy and perseverance. In consequence thereof the disease will probably appear after the lapse of more or less time in a more aggravated and dangerous form, less amenable to treatment, and more likely to develop into incurable conditions. In the worst situation, however, those will be who have been declared to be syphilitics, and treated as such on a mere suspicion or without any positive and incontrovertible evidence. In my experience—and I feel confident that I do not stand alone in this opinion—*nonsyphilitic* syphilitics, so to speak, are the most deplorable and unfortunate people, and furnish the largest proportions of those hypochondriacs and syphilophobes, who live in constant fear of outbreaks of the disease, which never appear, everywhere suspect symptoms of syphilis on themselves, and, rushing from treatment to treatment, one more severe than the other, generally without medical advice, succeed in undermining their bodily and psychical health in a more thorough manner than syphilis itself could ever have accomplished.

Under these circumstances I must avow that I can neither understand nor approve the position of those who advocate the early extirpation of suspicious venereal sores at a period where it is impossible to ascertain their real nature. It can not be denied that among the published lists of such cases a large number deserve to be considered as at least extremely doubtful. The same I venture to say in regard to those

who, mostly on the strength of theoretical reasoning, founded upon the bacillary origin of syphilis (which, while certainly highly probable, is not yet considered by the majority of syphilologists sufficiently established by facts), advise that general specific treatment be commenced as early as possible, in opposition to those who, more on the strength of actual experience, prefer, as a rule, to delay general treatment until the appearance of secondary symptoms. Whoever knows how easily the characteristic features of a hard chancre are simulated by ulcers of non-infecting nature, will admit that it is impossible to avoid errors. As long as there exists a reasonable doubt it ought to stand in favor of the patient, and every opportunity ought to be given him to be cleared of suspicion before the case becomes, through the application of treatment—often irreparably—prejudiced. Even if the physician may feel morally convinced that he has to do with syphilis in a given case, the diagnosis of syphilis ought to be made only when symptoms are present which, according to generally acknowledged principles of pathology, are not observed in any other disease but syphilis, or when other causes or diseases, which may produce the same or similar conditions, can be excluded with absolute certainty. Then it will be possible to follow a rule which has been given by Dr. J. C. Le Hardy, of Savannah, Ga., in an address before the Georgia Medical Association in April, 1885 (*Atlanta Medical and Surgical Journal*, N. S., ii, 1885-'86), and which I most emphatically indorse: "The exact nature of the disease should be so firmly fixed in the mind of the attending physician that no after circumstance, not even the disappearance of all the symptoms in a case diagnosed as syphilis, should shake his conviction or cause him to relax his efforts during the whole period necessary for the cure of that disease." That exceptional cases occur which demand immediate treatment, even where there may be a doubt, is readily conceded; the seat of the lesions or the grave character of the symptoms may demand instantaneous relief, and delay may involve irreparable loss. This will be the case most frequently in iritis and other eye troubles, and in tertiary affections, particularly of internal organs.

Difficulties of Diagnosis.—While in a great many cases, probably in a large majority, the diagnosis may be simple and easy, certain circumstances may render it extremely difficult in others. In the first place, in making the diagnosis of syphilis we have to rely entirely on clinical facts, because microscopy and bacteriology, to which nowadays we are used to look for the decisive vote in diagnostic controversies, so far have not offered an absolutely sure test for syphilis, certainly not one to be applied during the lifetime of the patient. Efforts have not been wanting to supply decisive data, and many a time the hopes of the scientific world have been raised to high expectation of seeing this important want filled.

Now characteristic cells, now characteristic grouping and co-ordination of cells, now peculiar conditions of blood-vessels, were believed to truly have furnished the proof for syphilis; but after a short time the same phenomena were found to exist in other pathological tissues clearly not connected with syphilis. So, notwithstanding what may be claimed by some microscopists, under the present state of pathological histology the microscope has failed to reveal histological conditions which were not common to several or all specimens of that class of new formations which since Virchow are known as granulomata, and therefore not pathognomonic of syphilis. Nor can it be admitted that the numerous efforts which have been made since bacteriology has come into existence to clear up the nature of syphilis have been successful in establishing a bacteriological test. Even the discoveries of Lustgarten and others, which so far seem to have come nearest to fulfill the stringent scientific demands, have by no means been generally acknowledged as meeting with all the conditions necessary to establish for the bacilli relations to syphilis similar to those of the bacillus tuberculosis to tuberculosis.

The proof of the bacteriological origin of syphilis will be particularly difficult or perhaps impossible, because experiment on animals, which has furnished such important facts in the pathology of other diseases, like tuberculosis, can not be applied to syphilis, since so far no animal has shown any specific reaction on inoculation; even a few experiments on monkeys, made by several French authors, having failed to give satisfactory results. Experiments on men being out of the question, no exact scientific method is available for diagnosis but the negative result of auto-inoculation with the secretion of doubtful sores. Restricted, therefore, to the clinical symptoms, even here we meet with different obstacles. Peculiar to syphilis, and almost unique in pathology, is the occurrence, as a regular feature of the disease, of periods of latency, during which even the most minute examination will be unable to discover the slightest symptom revealing the presence of syphilitic infection, which again may become manifest in an active form within a very short time. Such periods exist soon after infection, but are observed with increasing frequency in later periods. This will happen in a larger proportion of syphilitic women than men; but even among the latter, I feel convinced, the temporary complete disappearance of symptoms occurs a good deal oftener than most text-books will admit. The initial lesion may heal without leaving the slightest mark, the swelling of the neighboring lymphatic glands, generally the inguinal groups, may develop in a very slight degree, and after a short treatment retain so little of the enlargement that it will be impossible to decide whether their volume can be considered pathological or not. Besides, the inguinal ganglia are not rarely found moderately enlarged in consequence of intense muscular exertions

incidental to heavy labor or to indulgence in athletic sports. Or these glands may be entirely absent, having been previously removed by operation, as I have observed in a few instances. The general enlargement of the different regular groups of lymphatic glands (cervical, axillary, epitrochlear, submaxillary, and popliteal) is not found so constantly as is often described, but rather forms a distinct symptom of the later stages of syphilis, while the indolent swelling of one or several of the above-named groups is indeed of frequent occurrence even in well-treated cases.

Other difficulties in diagnosis are presented by the fact that syphilis may affect every tissue and every organ of the human body. The examination, therefore, of every part of the body is demanded of the physician, and at least a certain knowledge of every branch of pathology, to be able to recognize syphilis in all its features. And, not content with extending its influence over the entire human organism, syphilis is not restricted to a single form of symptoms, but is manifest in the production of a great variety of lesions, nowhere so conspicuously as on the skin. But its true character of the Mephisto among the diseases, syphilis manifests in the tendency to appear in forms which closely resemble or almost simulate the types of others more common or perhaps less obnoxious diseases. In a lecture entitled *Syphilis as an Imitator* (British Medical Journal, April 5 and 12, 1879) Hutehinson has considered at length this remarkable fact, which is attested by a number of names, like syphilitic lichen, syphilitic psoriasis, syphilitic lupus, which have been long in use, and, although condemned as unscientific and misleading, present themselves again and again in spite of all efforts to suppress them. It is true that on close examination the syphilitic product, as a rule, presents some peculiarities which allow of the recognition of the well-concealed facies, but often it will require a sharp and well-practiced eye to look through the disguise. In the initial lesion the shape of innocent lesions like herpes, eczema, etc., may be assumed. Secondary symptoms also furnish frequent instances, but the most numerous and most deceptive examples are found among the so-called tertiary affections of acquired and especially of hereditary syphilis. Those of the central nervous and of other internal organs particularly appear in so close imitation of diseases free from any specific taint, that in some instances the dividing line becomes completely obliterated. The older syphilis grows the more it loses its specific character, and, as Ricord has said, the more honorable a face it assumes.

It must further be kept in mind that infection with syphilis does not afford immunity from any other disease, but that it may associate itself with all other acute and chronic diseases and thereby give rise to the most complicated conditions. Patients and physicians are often inclined

to overlook this fact, and with the diagnosis of syphilis attribute every symptom that may appear to syphilis, and attempt to treat it as such.

A word may finally be said here in regard to the value of the history which is given by patients. It has been said that all syphilitics are liars and can not be trusted. In many cases this holds good, but quite often, particularly in females, the denial of all knowledge of primary and even secondary symptoms is undoubtedly sincere and honest, not to consider the numerous cases of those who have acquired their syphilis innocently or have inherited it. I have often been surprised how incompletely and inaccurately patients remember the symptoms they have had, how they deny some affections, how their memory fails or errs in relation to the time of certain affections or even of the primary sore, how the order of symptoms is confused, etc., and that in cases where the patient is fully aware that I have the notes of his case before me and that there is not the slightest reason for any deceit. On the other hand, some syphilitic patients are only too ready and willing to attribute to syphilis all and every ailment they become subject to, and on examination report all throat affections, rheumatic troubles, and particularly all forms of skin eruptions, however innocent, as sequelæ of their infection, the acne caused by the iodide of potash playing a very important part among these imaginary symptoms. All these circumstances are apt to greatly reduce the value of the history on which the diagnosis almost always has to rely to a certain extent.

Means and Rules of Diagnosis.—The question of the diagnosis of syphilis will confront the physician under different circumstances. First, a patient simply presents himself on account of some lesion or ailment in order to obtain treatment and relief, without having any knowledge or suspicion of its nature. Or, the patient seeks the physician with the direct and principal purpose to ascertain whether he has syphilis or not, or whether the symptoms which he has noticed on himself are due to syphilis or to some other cause. The characteristic features of the various manifestations of syphilis, as well as their differentiation from similar symptoms resulting from other diseases, have been amply treated in the chapters on symptomatology; here, only the general principles will be studied on which the proof of syphilitic infection has to be established.

It has been stated that the diagnosis ought to be founded either on the presence of such symptoms as are exclusively the product of syphilitic infection, or on the exclusion of diseases or causes other than syphilis, if the symptoms may be produced by such other causes as well as by syphilis. It is almost superfluous to mention that under all circumstances a careful and complete examination of the patient should be made, not only of that part or portion of the body which the patient

himself offers for inspection but of the entire body. Where circumstances permit, the rule often given as absolutely necessary, to have the patient stripped entirely, may well be followed; reasons of policy or discretion, particularly where it is desirable not to arouse suspicions or apprehensions at once, may even in cases of male individuals render it more advisable to expose one portion of the body after the other. In the case of females this ought always be the method of examination, even in hospitals and other public institutions. Syphilis is so common a disease that the physician has constantly to be on the alert to detect its traces, not alone if the seat of the symptoms on the genital organs or the character of the bearer suggests the probability or possibility of a venereal infection. While syphilis is chiefly conveyed by sexual intercourse, the fact must not be lost sight of that its distribution has assumed such dimensions in all civilized countries that it has become more or less a common disease, and quite frequently is transferred by other means than sexual contact with the innocent as well as on those who court contagion by their associations. There are a number of pathological conditions so characteristic that they point in the most direct manner to syphilitic infection as their exclusive origin, so that in their presence the diagnosis can be made almost at a glance. Among these really typical phenomena have to be enumerated certain forms of primary lesion, some of the skin eruptions, particularly the papular syphilides, as well as certain macular exanthemata, for which the location is generally of great importance. Moist papules or condylomata lata of the genital and anal sphere, symmetrical ulcers of the tonsils with gray, lardaceous surface, mucous patches of the oral cavity, gummatous iritis, papules of the palms, gummatous ulcers of the pharynx, and among the later manifestations on the general integument rupia forms and the serpiginous tubercular and ulcerating syphilides are equally distinctly specific manifestations, which under no circumstances leave any doubt of syphilis.

Besides these absolutely convincing symptoms, there are others which, although strongly suspicious, are not alone sufficient to establish the proof of the presence of syphilis. Such symptoms are, for instance, mild angina with or without enlargement and sensitiveness of the submaxillary lymphatic ganglia, erosions and ulcers of the tongue, more or less extensive loss of hair in patches, simple iritis, painful nodes of the superficial bones, perforations of the nasal septum, nodes of the skin and of the subcutaneous tissue, indolent swelling of the testicle and its adnexa. Often enough the patient presents several symptoms of such character, or even a single one. Suspicion being awakened, it now becomes necessary to carefully look for confirmation of their specific nature. It may be possible to find other actual phenomena which will support the opinion, or sometimes only remnants or permanent sequelæ of former affections, like

scars, etc. The most important information may often be gained from the history of the beginning and the development of the present condition, and from its relations to other symptoms which may coexist or may have been present at a former time.

It is of the greatest importance for diagnosis that syphilis usually follows a certain course through several more or less well-defined stages; within these periods certain symptoms follow others at regular intervals, or appear contemporaneously with other symptoms belonging to the same stage. This regularity has led to the classification of the different manifestations as primary, secondary, and tertiary symptoms. While it is true that these periods or stages, particularly the second and third, frequently overlap, that the third may anticipate the second, or that secondary symptoms may appear at a long interval after tertiary ones, these laws and rules are sufficiently consistent to often enable one to assign without difficulty particular symptoms to their proper place in the gradual development of syphilis. The fact that a certain symptom is observed within a certain time after exposure to infection when, according to common experience, just such a condition was to be expected, materially increases its value for diagnosis. If it is known, for instance, that a patient has first noticed at a certain date a sore of suspicious character, which has disappeared or has been removed by excision, and six to eight weeks after the appearance a number of small red spots or a limited number of small, slightly squamous papules are observed on his trunk, this insignificant eruption, which in itself would have to be considered doubtful, now assumes the character of positive proof of syphilis, provided it can be ascertained that no drugs liable to produce similar eruptions have been administered, or that the patient is not subject to psoriasis. In a similar manner the simultaneous presence of certain symptoms may reveal their specific nature. For instance, a macular eruption disseminated over the chest and trunk, even if not of a very decided character, when found together with a reddened, slightly swollen throat, moderate swelling of one or more cervical glands, and perhaps a certain amount of alopecia, furnish an *ensemble* of symptoms which justifies the diagnosis of syphilis. Sometimes the condition of an eruption when first observed may not be sufficiently characteristic for a diagnosis, but if left to itself and watched for a certain time its further development and changes, regularly met with in syphilis, but not in similar lesions derived from other causes, may decide the question in the most positive manner. In other cases it may be necessary, particularly in the presence of symptoms belonging to the more advanced stages of the disease, to rely on the prompt efforts of specific treatment in order to decide in favor of their syphilitic nature.

Great care, however, should be exercised in the employment of treat-

ment as a test, particularly with iodide of potassium, because several other diseases are as readily affected by it as syphilis, particularly affections of the lymphatic apparatus, of the testicle and epididymis, swellings of the bones and joints, etc. Unless delay involves danger to some important organ, even in tertiary affections, preference should be given to mercury as the remedy for a test, as it must be considered more a specific drug for syphilis than iodine. On the other hand, it must be remembered that the effects of treatment may greatly interfere with the development of syphilitic lesions into their full pathognomonic maturity; that during continued treatment the degree of infiltration of the cutis in a papillary syphilide may hardly exceed the condition of a secondary roseola, thus apparently reversing the regular succession of symptoms and provoking errors of judgment.

As in all such cases the physician has to rely to a certain extent on the history of the case, and mostly on the reports of the patients themselves, it becomes painfully obvious how deplorable the unreliability of such means of evidence really becomes.

(a) **Primary Stage.**—The only symptoms of the primary stage are the initial lesion, the chancre, and the indolent swelling of those groups of lymphatic ganglia with which the lymph-vessels emanating from its seat directly communicate. The primary lesion may appear in various shapes, but its most characteristic feature is always the induration, that peculiar infiltration of the base or of the entire circumference of the lesion. It may assume considerable dimensions, and then it gives to the touch the same sensation as a lump of soft rubber; where it is only moderately developed it causes a peculiar stiffness, as if a piece of parchment was imbedded in the base of the sore. Although very rarely, induration may be entirely absent, and the primary sore may never exceed the condition of a very innocent-looking erosion, particularly on the external sexual organs of the female. The second symptom, the swelling of the neighboring glands, is equally constant, but has been found to be occasionally absent.

As soon as a more or less distinct induration begins to develop in a primary lesion the diagnosis becomes possible. Where it can be ascertained that the first appearance of the lesion was noticed a certain time after exposure to contagion, or where the source of infection by confrontation or by reliable information (not rarely obtained in cases of married women infected by their husbands) is known to be syphilitic, even a very slight degree of induration, felt only by the most subtle lateral compression, may permit a diagnosis with almost absolute certainty, the swelling of the lymphatic glands will soon confirm it. In such cases the diagnosis can be quite obvious, but it becomes more complicated, and not rarely impossible, if several lesions of similar or different appearance are

met with on the genitals, which may have appeared immediately or only a few days after the probable infection, or where it is impossible to fix the date of the latter, or where the lesions have been cauterized either by a physician or by the patient himself, the use of the stick of the nitrate of silver being particularly liable to render the real condition obscure. A simple herpes or a slight abrasion may be present, which either heals at first only to break out again after the period of incubation has passed, or may not run the usual mild course, but after the proper time assume a more characteristic and finally a typical appearance. In other cases only the indolent swelling of the glands, or even the development of secondary symptoms, may decide the question. The indolent bubo may sometimes be deprived of its diagnostic value by acute inflammation or by suppuration—not so rare a complication, but not a symptom of syphilis itself. Under such circumstances the physician may have held his diagnosis in abeyance often for four or five weeks or longer. It may occasionally be judicious to give some indifferent or tonic medicine (but not iodine) to satisfy the patient's urgent solicitations; it happens, however, that such internal treatment afterward plays a figure in the patient's history and deceives other physicians under whose care he may come. In the face of some statistics, particularly in regard to the relations of syphilis and tabes dorsalis, it seems probable that such cases would be admitted as undoubtedly syphilitic on the strength of the patient's statement that he had general treatment after a sore on the genitals.

There are several conditions which may resemble the primary lesion with its typical induration: chancreoids and simple abrasions on the privates, which have been cauterized, may show an inflammatory hardness of their base or of their surroundings; on certain localities, as on the frenulum, insignificant tears or abrasions may become hard, owing to frequent traction; œdema of the prepuce, particularly in paraphimosis, may assume a hardness which greatly resembles specific induration. Fistulous ulcers resulting from abscesses of Bartholini's glands in the female, or, in the male, suppuration of the glandular adnexa in the folds of the frenulum or glandular abscesses in the sulcus coronarius, occurring in connection with gonorrhœal urethritis, not rarely show borders of almost cartilaginous consistence. Primary lesions of the lips of the meatus urinarius, or of the fossa navicularis, may easily be mistaken for inflammatory swelling incidental to gonorrhœa. In all such cases a more or less intense acute swelling of the inguinal glands may be present and may increase the difficulties of diagnosis, the more as the syphilitic bubo sometimes shows a certain amount of sensitiveness on pressure or even of spontaneous pain. Sometimes the primary lesion or lesions on the genitals of females may appear in the shape of papules closely resembling those usually met with as secondary lesions on the same localities; *vice versa*, a solitary or a small

number of secondary papules may be mistaken for primary sores. Here the condition of the lymphatic ganglia may fail to afford any information, while often the history decides the diagnosis.

Other sources of deception are chancreoids or other ulcers, and erosions on the genitals of patients who, after having acquired syphilis at some previous time, expose themselves to new infections. In such cases the sores may exhibit a certain amount of induration of the base and borders which can hardly be distinguished from primary sores. Tarnowsky has shown that such pseudo-chancres can be provoked or artificially produced by mechanical or chemical irritation of abrasions or small wounds in syphilitics. Undoubtedly such lesions have occasionally been mistaken for primary chancres, and have furnished some reputed cases of syphilitic reinfection. The same can be maintained of ulcers which result from the breaking down of circumscribed gummatous infiltrations of the prepuce, the glands, and other portions of the penis, which are of much more frequent occurrence than is generally acknowledged. The absence of swelling of the inguinal glands will be of great weight for diagnosis in such cases as well as the more rapid and more complete breaking down of the nodules compared with ulcerated chancres.

Altogether the primary lesions of the genitals are not so likely to be overlooked, because on account of their seat they will readily invite suspicion of venereal infection. Not so with chancres of extragenital location, which usually afford much wider opportunities for the infection, directly or indirectly, of the innocent. The early recognition of chancres on the lips, tongue, tonsils, bearded face, nipples, and particularly of the fingers, is therefore of the utmost importance. Unfortunately, they often escape recognition, particularly because the separation of infection and appearance of the sore by the period of incubation fails to arouse suspicion and increases the difficulty of connecting the chancre with its source. In regard to syphilitic infection of the oral cavity, it does not seem unnecessary to mention that Kaposi (Moritz Kohn, *Syphilis der Schleimhaut der Mundhöhle*, etc., Erlangen, 1856) has claimed that almost exclusively in children, and not rarely in adults, the primary lesion in the oral cavity, on the lips, tongue, etc., appears in the shape of papules, excoriations, rhagades, superficial ulcers, etc., of the same character as they are usually observed in the secondary stage of general syphilitic infection.

In extra-genital infection it is not uncommon that the swelling of certain groups of lymphatic ganglia is the first and only symptom observed by the patient and presented to the physician, and that this swelling leads to the detection of the primary lesion. It is obvious, therefore, that they deserve the closest attention and the most minute examination of those localities to which the glands point as the probable seat of the lesion.

It remains to mention that on the genital organs, as well as on other localities, principally on the mucous membranes, the primary lesion of syphilis may bear close resemblance to tuberculosis and to epithelioma, and that through mistakes unnecessary operations have often been performed. The lymphatic ganglia may be enlarged in all such cases, and consequently are devoid of diagnostic significance. The mode and duration of development, but often only microscopical examination, will furnish decisive points for diagnosis.

(b) **Secondary Stage.**—The character of the secondary stage of syphilis is essentially that of a general infectious disease, which, like the acute exanthemata, takes possession of the entire organism and manifests itself at first by a number of more or less widely and symmetrically distributed phenomena, principally on the skin and on the mucous membranes of the throat and mouth. Unlike those diseases, however, it does not exhaust its power with the first outbreak, but has a tendency to recur from time to time, usually in more aggravated forms, still of general distribution, but accompanied by pathological conditions in almost all other organs of the body. Its symptoms generally succeed each other with a certain regularity, run a limited course, and in most instances leave the affected organs unimpaired in their functions and structure. If syphilis deviates from this regular course it has a tendency rather to advance than to take a step backward; it is more common to meet with precocious tertiary symptoms in the earlier period than to find the secondary stage prolonged indefinitely or into the tertiary. The secondary stage therefore presents a large number and a great variety of symptoms which on one hand add to the difficulties, and on the other offer greater facilities for diagnosis by the formation of combinations of several symptoms in different organs.

The early period which inaugurates general infection usually presents the least difficulty, particularly where a primary lesion has been observed, and where after the usual period of incubation the appearance of secondary symptoms is expected. Prodromal symptoms, as slight fever, rheumatic pains, anæmic condition, and general *malaise*, may still more facilitate the immediate discovery of the disease. Prolonged incubation may again render the diagnosis doubtful, and may demand further observation and suspense. The appearance of one or more solitary papules or pustules of a character generally found in later periods, which have been described as preliminary localized syphilides, occasionally precedes the general eruption, and may prove embarrassing and mystifying for diagnosis. Where nothing is known of the primary lesion, and the prodromal symptoms, particularly fever, appear with great intensity, while the first lesions on the skin are observed outside of the usual localities—for instance, on the face, or around the throat, and in limited number—the symptoms may

closely resemble those of measles, smallpox, scarlatina, or rubeola, and cause mistakes, which, however, by a few days' observation will be corrected. Recurrent eruptions of general syphilides are rarely accompanied by intense fever or other severe symptoms.

The affections of the skin or syphilides are by far the most important manifestations of the secondary stage; next to them follow those of the mucous membranes of the mouth and throat. It is to these two organs that we have to look for the means of diagnosis in most cases, and from which we are able to derive the most important testimony.

The early as well as the later syphilides, particularly those of more or less general distribution, bear certain characteristic features, which, as a rule, render their recognition and exact definition more or less easy. Their color and pigmentation, their polymorphism, their mode of grouping, prominently the formation of annular and circular lines, their symmetrical localization, their mode of development, the consistency and color of scales and crusts, the absence of itching, are the principal points of distinction, as have been fully described in preceding chapters, to which we must refer the reader for all the details of information. With all these distinctive peculiarities of the syphilides, however, it must be acknowledged that without some practical experience it is not always easy to recognize their specific character; and while the practiced eye may acquire a certain almost instinctive perception for the syphilitic taint, the diagnostician will often hesitate and confess the inability of a definite distinction without repeated observation.

Among the most characteristic skin lesions due to syphilis are the soft papules or condylomata lata of the anal region, the scrotum, the vulva, and the folds of the vulvar region, the dependent surface of the mammaræ, the axillæ, etc. Solitary papules and pustules of the hairy scalp and the papular syphilide of the forehead, often called the corona syphilitica, are also of great value for diagnosis. But scaly papules or patches on the palms and soles, although a common product of syphilis, ought not to be considered as an absolute sign of syphilis, since eczema, psoriasis, and lichen ruber (pityriasis rubra pilaris) may occur on these localities. On the contrary, other skin lesions are particularly apt to cause errors of diagnosis; for instance, certain forms of pustular syphilides are difficult to distinguish from lesions of simple acne, as is indicated by the name of the "acneform" syphilide; lichen syphiliticus, the small papular syphilide in groups and patches, as the very name indicates, may closely resemble the disseminated form of lichen planus.

The precocious appearance of ulcerating and other aggravated forms of skin affections of the tertiary type is not likely to cause difficulties in the diagnosis of syphilis itself, but may rather lead to mistakes in regard to the duration of the disease and to the time elapsed since infection.

Among the nonspecific skin diseases particular attention must be called to erythema multiforme, which appears in syphilitic patients either as a complication from causes which are equally active in its production in nonsyphilitic individuals, or from certain influences of the syphilitic virus on the nerves, or as a drug exanthem in consequence of the drugs employed in the treatment of syphilis, particularly of mercury. It may be easily mistaken for a syphilide, the more so as it sometimes assumes a darker, more bluish tint under the influence of syphilis. While it may often be very difficult to distinguish the syphilides from the other skin diseases if they appear alone, the physician's diagnostic skill will be taxed much more severely if eczema, acne, psoriasis, scabies, and other skin diseases are simultaneously present on the patient, whether syphilis has appeared on a patient previously or habitually affected with these common diseases, or that the latter have been added as complications to the pre-existing syphilis.

Next to the external integument the mucous membrane of the oral and pharyngeal cavities becomes the most frequent seat of syphilitic manifestations of the secondary stage, the soft palate, the tonsils, the tongue, and the lips being favorite spots for their localization. Some of them present conditions not less characteristic than those of the skin. Others may resemble simple catarrhal affections, tonsillitis, diphtheria, etc., particularly during the early stages, when fever, acute swelling of the submaxillary glands, and general symptoms may largely increase the difficulties; tuberculous lesions and other malignant ulcers and new growths will not so easily be confounded with early syphilitic lesions.

In most instances we shall not look in vain for pathognomonic symptoms on the skin or on the mucous membrane; still it may happen that neither the one nor the other is affected at all, or so slightly that they are entirely overlooked by the patient—the early syphilides being particularly likely to be neglected because, as a rule, they cause little inconvenience as long as they are not exposed to view under ordinary circumstances. Other symptoms, therefore, may be first present, or we may have to look for syphilitic manifestations elsewhere. The different groups of lymphatic ganglia distributed over the entire body furnish important testimony. In the majority of cases one at least of the different groups is found to be enlarged in the manner characteristic of syphilis, in others a participation of almost all the groups will be observed. Great stress has been laid by some authors on the enlargement of the cubital or epitrochlear gland; by others its pathognomonic significance has been questioned, and correctly so, I believe.

Other symptoms which are of not infrequent occurrence in the secondary stage are loss of hair, iritis, early periostitis or joint affections with more or less pain, particularly cephalalgia where the cranial bones

are involved, affections of the nails, etc. Taken singly these symptoms may not be sufficient to determine the presence of syphilis. But if two or more are present, or if they are found in combination with suspicious even if not fully characteristic affections of the skin or of the mucous membranes, they will allow of a positive diagnosis. It is well to remember that among the affections of the internal organs of the human body those of the nervous centers are most frequently observed during comparatively early periods of syphilis. Mauriac, I believe, is right in maintaining that the later the affections of the nervous central organs make their appearance the less probable is their connection with syphilis. Visceral syphilis of the other important organs, including the testicle and its adnexa, are only exceptionally observed in the earlier stages.

It must be well understood that, in general, syphilis will develop its perfect types only as long as it is left alone, but as soon as treatment has begun to exert its influence the characteristic features become modified and in many instances only fragmentary. It is certainly rare at the present time to see a patient pass successively through all the stages of syphilis in regular order. The continued treatment with small doses of mercury is particularly likely to interfere with the course of the disease, and it is by no means exceptional to never again meet with any manifestations of syphilis after the first set of secondary symptoms has disappeared. Treatment inaugurated before the appearance of secondary symptoms seems even more liable to change the regularity in the course of the disease. From my own experience, I am inclined to the belief that it causes more fragmentary but nevertheless more aggravated and obstinately returning forms. It is true that irregularities and malignity may occur without any treatment at all, but not as frequently, I believe, as under the circumstances just mentioned.

It may happen that the physician finds it absolutely impossible to recognize the presence of syphilis, even at a comparatively early time after infection. In the absence of a reliable history it can not be recommended, under such circumstances, to subject the patient to any specific treatment, but it seems advisable rather to await the actual forthcoming of symptoms more or less absolutely indicative of syphilis. In other cases, where there are strong reasons for suspicion, and where the nature of the lesions precludes the effectiveness of specific treatment unless syphilis was really their cause, the therapeutic test may well be applied and prompt curative effects accepted as a criterion. For skin affections resembling psoriasis the results of treatment with iodide of potash would not be of diagnostic value, since excellent results from iodine in psoriasis vulgaris have been reported by several authors.

Treated or not treated, the older syphilis becomes the more difficult will be the diagnosis, because the symptoms will be less numerous, more

fragmentary, and obscure. There are a number of other conditions which are always strongly suggestive of syphilis, as paralysis of the cerebral nerves, principally of those affecting the eye, persistent neuralgia, nocturnal headache, repeated abortions, which can lead to a certain diagnosis if other confirmatory evidence can be produced. Besides these more distinct and by no means unimportant symptoms, we often observe a number of trifling and obscure affections, which, while of no great consequence in themselves, are almost constantly teasing and harassing the patient: rather indefinite spots or papules on different parts of the body—now on the wrist, now on the neck, then again on the penis—not symmetrical, more often slight lesions on the tongue and on the lips. The latter are often due to smoking or other mechanical or chemical irritation, sometimes probably to mercurial treatment. In appearance they do not differ from similar lesions observed on persons absolutely free from any syphilitic taint, but subject to similar local irritation, who as a rule will not consider it necessary to consult a physician on their account. But the syphilitic will worry about them, and often can not be persuaded to believe that they have nothing to do with his syphilis. Mercurial treatment may occasionally be followed by their disappearance, or it may show no influence at all, or may even aggravate them. As a rule, they disappear under simple and mild local remedies, only to appear again and again in shorter or longer intervals, spontaneously or on provocation. I believe, however, that the diagnosis of syphilis ought not to be made on the presence of lesions of such character, nor ought they to be considered as actual recurrent outbreaks of syphilis even in a person known to be syphilitic. A similar position has to be taken in regard to recurrent attacks of herpes progenitalis, which are frequently observed on syphilitics, but can not be accepted as a symptom of syphilis.

(c) **Tertiary Stage.**—In the tertiary stage syphilis has lost its general character; its actions do not affect the general health any longer except indirectly, if important organs become the seat of the lesions. All regularity as to topography, chronology, recurrence, course, etc., is at an end; capriciously now this now that organ is selected for some manifestation, which may continue indefinitely, or heal either spontaneously or from treatment, but rarely without leaving some loss of substance or some irreparable functional impairment. The importance of the lesions is therefore practically a local one, depending on their seat, and as it is almost universally accepted that in the tertiary stage syphilis has lost its contagiousness, the diagnosis loses a good deal of its gravity for the patient, at least as far as his social and family relations are concerned. Nevertheless, the same principles ought to be adhered to in making the diagnosis which have been adopted for the other stages, only we shall more frequently find occasion to rely on the effect of antisyphilitic treatment.

The history of the patient, of precarious value under any circumstances, will disappoint even much oftener in tertiary syphilis than in the early stages. The considerations which induce patients to purposely deny or conceal their infection may prevail to the same extent, or even more, in after years, but often enough the denial may be made in good faith, either because the long time elapsed since the infection may have obliterated all remembrance of the facts, or because the early symptoms have not been observed or their nature not recognized. The rather well-established fact that cases with very mild early symptoms are more frequently followed by tertiary symptoms renders this supposition not so improbable. In women, particularly, experience has taught me almost to make it a rule, in the face of symptoms apparently of tertiary character, to question as little as possible; often, in the course of time, I have received valuable voluntary information which at first was obstinately withheld, while apparently unwelcome investigation has been met with a flat denial and subsequent disappearance of the patient. Syphilis acquired during childhood is naturally much more liable to leave the patients ignorant of their condition. Of course, where a distinct history is obtained it will help a great deal to make the diagnosis certain, and will lend decisive value to symptoms otherwise doubtful. Under any circumstances, a careful examination may confirm the diagnosis by the discovery of signs of former affections. In the first line, those localities which are the favorite seat of secondary and primary affections should be subjected to a scrutinizing exploration: the lymphatic ganglia for remnants of enlargement, the genitals for characteristic scars from primary sores, the entire skin for scars and pigmentation, the oral and pharyngeal cavities for scars, the eyes for changes in iris and cornea, the joints and superficial bones for thickened portions or irregularities of their surfaces. The anal region, the corners of the mouth, and the lips are most frequently the seat of characteristic scars, the lower extremities of peculiar pigmentation. Every scar on the legs should not be accepted as a proof of syphilis, since ulcers of undoubtedly mechanical origin may leave conditions exactly like those from unmistakably syphilitic ulcers.

The tertiary symptoms themselves are often just as typical and significant as those of the secondary stage, so that they will at once establish the diagnosis. All the organs which are accessible to visual or tactile examination furnish numerous examples of such manifestations. The skin and subcutaneous tissue, the nose, throat, and larynx, and their mucous membranes, the testicles, the superficial bones—particularly those of the cranium, the tibiae, clavulae, ribs, and sternum—present conditions entirely peculiar to tertiary syphilis. Several forms of skin affection have been mentioned before; the subcutaneous gumma and ulcers resulting from them, rupia, the tubercular serpiginous syphilide, present pictures

not easily to be mistaken. In certain localities, however, particularly on the outside of the nose, the ulcerating gummatous process may establish conditions closely resembling lupus; the scarcity of tubercle bacilli in true tuberculous lupus will not always allow us to obtain the microscopical proof. The often disastrous effect of cauterizations and operations in such cases not only justifies a trial of specific treatment, but ought to make it almost imperative. The same may be said of the ulcerative processes of the soft and hard palate, the pharynx, and of the nasal cavity, particularly when perforation seems imminent. Here the effects of iodide of potassium or mercury, or of both combined, may serve to the exclusion of tuberculous and carcinomatous affections, although often enough the syphilitic character will be just as conspicuous as in cutaneous affections. The importance of gummatous ulcers on the genitals has been duly considered already. Both on the skin and on the mucous membranes the condition of the scars formed by tertiary lesions will often be of the greatest value for diagnosis, the radiate form prevailing on the latter, while on the former the sharp-edged, round or kidney-shaped scar is common.

The tongue is a favorite seat of tertiary lesions, and probably nowhere else will the differentiation of syphilitic ulcers and papillary growths from tuberculosis, and principally from epithelioma, be so difficult, while real gummata are more readily recognized. The influence of irritating agents, particularly of tobacco, must be taken into consideration in affections of the tongue.

Syphilitic new growths of the testicles and epididymis—the latter of rare occurrence compared with gonorrhœal swellings—while easily discovered, are not always distinguishable from other new growths, although their great consistency, the absence of pain and sensitiveness, will render their specific nature very probable, more against tuberculosis than against sarcoma and carcinoma. Among the lesions of the superficial bones, if not complicated with ulcerations, periostitis, and osteitis, do not differ much from traumatic and other nonspecific forms; the spontaneous pain, mostly exacerbating at night, is more characteristic of syphilis, but the peculiar consistency of the true gummatous swelling will offer less difficulty of recognition.

While it is true in most instances that the products of tertiary syphilis show a more rapid development than other new growths like epithelioma, sarcoma, and tuberculosis (lupus), and have a greater tendency to break down and to ulcerate, occasionally the newly formed granulation tissue becomes transformed into substantial and almost sclerotic connective tissue of great durability, not only on the bones, where periostitis ossificans is by no means rare in syphilis, but also on the external integument. Such formations have become the object of operations in con-

sequence of a wrong diagnosis, as shown by the experience of some of the most eminent surgeons.

As another manifestation of tertiary syphilis, which only within the last few years has attracted the attention of several authors, and which may become of importance for diagnosis and treatment, we here must mention certain alterations of the skin observed on the finger-tips which seem to be the result of a chronic arteritis or endarteritis of the peripheral blood-vessels due to syphilis: coldness, bluish color, circumscribed necrosis, and exfoliation of the epidermis or more deeply reaching gangrene—symptoms resembling those of symmetrical gangrene and Raynaud's disease.

For the diagnosis of visceral syphilis, the tertiary affections of the internal organs—liver, spleen, kidneys, lungs, heart, and particularly of the great nervous centers, spine, and brain—almost every positive sign is generally wanting; the symptoms do not essentially differ from similar affections resulting from other causes except by their fragmentary and incomplete nature, and circumstantial evidence is required to refer them to syphilis. This evidence may be furnished by the history of the patient and therefore be uncertain or untrustworthy. However, where it is positively known that a patient was infected with syphilis at a more or less remote period of his life, it has always to be considered as the possible cause even of common affections, and, where the usual causes can be excluded, has to be accepted as the etiological factor.

The most important evidence will be found in the discovery of scars, swollen lymphatic ganglia, intumescence of the tibia and other bones, certain conditions of the eye and other distinguishing residua of former manifestations, and they must be carefully looked for in all such cases. Sometimes, mostly in cases of nervous affections, the age of the patient will be of great consequence for the diagnosis. All efforts to find the connecting link between a visceral affection and syphilis may often be in vain, and nothing will guide us in the diagnosis but the experience that such affections occur frequently in individuals known to be syphilitic or have actually been proved to have been produced by syphilis before. In such a situation quite often the test of antisymphilitic treatment will be the only means of confirmation of the diagnosis. Its application will be so much more justified, since often important organs are threatened with entire destruction or functional impairment. In many cases the good results of the therapeutic measures will support the diagnosis; a negative result does not always prove the absence of syphilis, for often the syphilitic process has accomplished its mischief in such a manner that its results are beyond the influence of treatment, while its further progress can be arrested.

The affections of the nervous centers are undoubtedly by far the most

frequent and most important examples of visceral syphilis. Whether everything is really due to syphilis that modern neurology is attempting to lay at its feet, the future will decide. But in the face of this tendency to find syphilis at the bottom of almost all chronic brain and spine diseases, the imperative demand for a careful, conscientious diagnosis is doubly justified.

(*d*) **Hereditary Syphilis.**—The diagnosis of hereditary syphilis in early life, where its manifestations are most frequently observed, is, as a rule, comparatively easy. The history of the parents and of other children of the same family may furnish important testimony, the proof that one of the parents, or both, have been infected with syphilis before or at the time of conception, or during the pregnancy of the mother, being the principal one; the knowledge of the fact that children previously born have had signs of syphilis being the next in importance. In the absence of such direct evidence, the repeated occurrence of miscarriages and great mortality of children in early life in the family previously to the birth of the child which forms the object of the inquiry, indirectly points strongly toward syphilis. The examination of the child, however, will result in the discovery of one or more characteristic symptoms. The affection of the nose, the rhagades of the lips and corners of the mouth, papular, pustular, and particularly bullous eruptions, their localization around the anus and the genitals and on the palms and soles, swelling of the testicle, and of the epiphyses of the bones of the extremities, and very often the poor nutrition and development, are the most conspicuous signs. In milder cases the children may be well nourished and in perfect health, exhibiting only one or a few of the above-named symptoms developed to a slight degree; occasionally only a few broad papules may be present in the anal region. All these manifestations may be expected to be present immediately after birth, or to appear within a few months, certainly within the first year. It is well, however, to remember that syphilis may be acquired very early in life; that in such cases infection almost invariably takes place in the mouth, or at least outside of the genitals; and that, according to Kaposi, the primary lesion may take the shape of a papule or other lesion closely resembling those of secondary eruptions, instead of the form of the typical primary lesion.

The diagnosis of hereditary syphilis is much more difficult in older children, at the time of puberty, and even in adult life, whether symptoms suggestive of syphilis then be present or not. The history of the family may on investigation prove to be of some value, great mortality of children in the family sometimes furnishing a clew; more often no data of importance can be gathered. The examination of the patient himself ought to be directed in the first line to all those portions of the body which have been enumerated above as the principal seats of the

early manifestations of hereditary syphilis, in order to detect their traces. Where such symptoms have been present, delicate but entirely characteristic scars will almost invariably be found, particularly around the nose, mouth, and anus; the testicles may be found atrophied, or enlarged and abnormally hard. Particular attention is generally paid to that combination of symptoms known as the triad of Hutchinson—that is, the simultaneous existence of keratitis interstitialis, affection of the middle ear, and characteristic malformations of the front teeth of the second dentition, particularly central notches of the upper central incisors. The pathognomonic significance of this triad has been denied by some authors and accepted by others. In regard to the teeth, I am convinced that the importance of this symptom has been greatly overrated, and that almost every malformation or deficiency of the permanent teeth has been paraded as “Hutchinson’s teeth,” while in reality even the most essential form, the central notch of the upper incisors, can be observed on persons absolutely free from any syphilitic taint. Much more regular and important are the pathological conditions of the bones of the cranium, the face, and of the extremities, particularly of the tibiæ, for the detail of which we must refer to other chapters of this volume. As a rule, the whole appearance of those affected with hereditary syphilis bears the stamp of some irregularity of development; while the face has a rather senile expression, all the other portions of the body are corresponding to a much earlier period in life, making individuals of twenty resemble those of twelve or fifteen years, etc.

Besides these peculiar features, all those symptoms may be observed in hereditary syphilis which occur during the tertiary stage of acquired syphilis; as it seems that a much larger proportion of cases of hereditary syphilis than of acquired reaches the tertiary stage. There has been much debate on the question whether a *syphilis hereditaria tarda* really exists—that is, whether hereditary syphilis may develop its first manifestations a number of years—eight, ten, twelve years, and longer—after birth. It has been claimed that the apparent absence of the early symptoms must always be due to oversight or want of observation. I have never been able to understand the importance attached to this point; if early symptoms must necessarily have preceded, they may just as well have played their part during intra-uterine life, as numerous prematurely fetuses clearly demonstrate. With this explanation the late hereditary syphilis is entirely divested of its extraordinary features.

Ethics of Diagnosis.—The diagnosis of syphilis once made in a given case, the end of the difficulties is by no means always reached. Important questions will arise, which have less to do with the professional education and the scientific attainments of the physician than with his tact and personal character, with those qualities of the man and gen-

tleman, the possession of which, combined with knowledge of human life and of human nature, alone enable the physician to obtain and retain an honorable and dignified position in professional as well as in civil life. From what has been said in the early pages of this chapter on the importance of syphilis for the patient's life, it is easily understood that syphilis, probably more frequently than other diseases, will produce situations of embarrassing nature. This applies in a limited way only to public service in hospitals and dispensaries, but rather to private practice. No exact rules and regulations can be given in such matters, where in every single instance outward circumstances have to be considered for the guidance of the judgment of the physician. Some general suggestions, however, and the indication of the principal points in the conflict of interests, do not seem to be uncalled for at this place.

The first question which will present itself is, Shall the patient be informed that he or she has syphilis? Many important reasons strongly demand an affirmative answer, most urgently so, at least in reference to the early stages, the contagiousness of the disease. Its serious character, the demands of methodical and continued treatment, the necessity of changes in the mode of life, the giving up of certain habits, like excessive smoking, drinking, etc., which require the active and intelligent co-operation of the patient, all point to the advisability of disclosing the nature of the disease at once and without restraint. As it is of the utmost importance in the case of syphilis to gain the fullest confidence of the patient in order to guide him safely through the long course of the disease, he certainly ought to be met with sincerity and truthfulness from the start: the discovery of one act of deceit, even if undertaken with the best of intentions, may shake or destroy forever absolute reliance on the physician's word. Still, there are weighty considerations which will not only permit but rather make it a duty to conceal the truth temporarily or permanently. The character and nervous disposition of the patients themselves, aside from external circumstances, may furnish sufficient reason to withhold the knowledge of their infection until in some way they can be prepared for the painful news. Many have such a fear and horror of syphilis, founded either on reliable information about its character, or much oftener on vague and exaggerated impressions and reports, that to find themselves suddenly brought within the power of the dreaded enemy may entirely unnerve them and fill them with despair. In other cases, outward circumstances, in the first line family relations, may add remorse and fear of disastrous consequences, so as to make the apprehension of some rash act by no means so unfounded. Although I have no personal knowledge that the discovery of syphilitic infection has really led any one to commit suicide, I certainly do not consider it among the impossibilities. Therefore I believe that the greatest care should be exercised to ascertain

the patient's disposition and his possible prejudices before telling him the truth or the whole truth at once. Under favorable circumstances the hint of a possibility of the infection may be given, and by gradually allaying the extreme fear and correcting the exaggerated ideas the final information may not prove such a shock.

Where the unfortunate victim is alone concerned in its consequences and is responsible to no one else, the duties of the physician will not bring him so much in conflict with his conscience; but much more embarrassing and complicated situations arise when the family relations of the patients increase the responsibilities of the infection—when in married people the infection of the one points to the other as its cause, or to a direct violation of sacred duties.

How are we to decide sometimes who is the culpable party, or whether the infecting party is not really innocent of any indiscretion, infection having taken place by accident and not by illicit intercourse? Observations of extra-genital chancres and the infection of innocents become more frequent with every year, and they often play mischief in families and give occasion for unjust insinuations and suspicions. Strange to say, it has been my experience that physicians who loudly preach the dangers of syphilitic infection by the use of pipes, cigars, drinking-vessels, etc., as something common, in practice will just as loudly denounce the patient as a liar and as an impostor who proclaims his innocence and claims accidental infection under by no means impossible or improbable circumstances. But even if we know who really is to blame, we often will be justified in concealing the true nature of the disease and its cause; not to shield the guilty parties, but to avoid bringing more misery and suffering upon the innocent ones by destroying their confidence in their partners for life, however undeservedly bestowed, and with it their own and often their families' happiness. Hereditary syphilis in children may here play a very important part.

In all such cases it is the danger of the infection of others which places so great a responsibility on the shoulders of the physician. Under any circumstances he must inform the patient of this danger, and give advice how infection may be prevented. This may be easy enough with unsuspecting persons, but may often require the greatest tact and skill. It is hardly necessary to mention that the same precautions have to be taken as soon as the slightest suspicion of syphilitic infection exists, and not to be relaxed until syphilis can be excluded with absolute certainty.

Another question arises if a third person seeks information from the physician about the syphilis of his patient. It is obvious that ordinarily he is bound to the strictest secrecy, and even to great caution in refusing information. But if employers inquire about servants or other employees, parents about their children, if the father of a daughter engaged to be

married seeks the medical attendant of his future son-in-law, a flat denial of or an evasion of the truth does not seem to be within the limits of the professional duties of the physician. In the first case, I believe it absolutely becomes the duty of the family physician to inform the family of the dangers of an infection imminent from a syphilitic servant or employee; he ought, however, to inform the infected person of the necessity of such a proceeding, and give him a chance to avoid exposure by immediate voluntary retirement; but in the case of a wet nurse all considerations are to be set aside, and the facts to be communicated immediately to the head of the family. For other physicians but the family physician such a duty would not seem to exist, probably not even the right to divulge anything concerning the disease of his patient. But, by a denial of the truth he may allay the well-founded suspicions of the inquirer, cause him to relax necessary precautions, and thus assume a certain responsibility in case of later infection. Evasive answers or absolute refusal to answer any questions would almost equal an acknowledgment of the facts; hence the dilemma in which the physician finds himself, the best way out of which would probably be to direct the inquirer to the patient himself, and at the same time inform the latter that inquiry about him has been made, and by whom. This seems to be the proper way to act in all the cases of more or less near relationship mentioned above, coupled with the urgent advice to the infected person to anticipate inquiry by voluntary confession; between children of minor age and parents it might be appropriate to set aside the restrictions of secrecy. Among other situations of this kind, which easily could be multiplied, I may mention inquiries made by life-insurance companies. No information at all ought to be given in such cases except on the distinct request of the patient seeking insurance, made either in writing or verbally, if possible in the presence of a witness. If doubtful situations occur in judiciary cases, it ought to be submitted to the judge whether a question concerning a patient's syphilis must be answered or not.

A further point deserving some consideration is whether it is advisable to give to the patient, in whose case the diagnosis of syphilis has just been made, any intimation or even fuller information concerning the probable course and particularly the probable duration of the disease or treatment, be it in answer to his inquiry or voluntarily. With a sensible person it seems to me decidedly preferable to perhaps increase for the moment the mortification felt over his misfortune, than to bring on disappointment after disappointment when all the trouble would seem to be over, and renewed prolongation after recovery had seemed certain. Once prepared for a continuous and arduous campaign, the patient will be more willing to conform to the necessary restrictions and ordinations, and will find the time of trial passing faster than he expected. On the

other hand, exaggerated imagination of the severity of his particular case, gradually distrust in either the capacity or the sincerity of his adviser, and finally entire loss of confidence in him will follow, and place the patient in a much worse condition. Those, however, who become deterred by the discouraging prospect of prolonged observation or treatment will not prove satisfactory or grateful patients either way, but will become neglectful of themselves, only to throw the blame of ill success on the physician.

A few words may be added, in conclusion, in regard to the moral side of the relations between the physician and the syphilitic patient. While I fully agree with those who say that the physician ought never to favor, encourage, or sanction immoral relations and illicit intercourse—that it is rather his duty to prevent them whenever he can do so—I can not acknowledge that the physician is constituted or ought to constitute himself a judge of his patient's morals. As soon as they have become infected with syphilis, even by their own indiscretion, and have been accepted as patients by the physician, they are entitled to the same consideration and to the same sympathy as those afflicted with other diseases. Syphilitic patients, who become disgusting and repulsive by their moral depravity and by their shameless manners, would hardly prove attractive without their syphilis; and nobody can blame a physician who refuses to treat them longer. But to consider a syphilitic, *eo ipso*, as an outcast, as an impious and wicked individual, is inhuman. If syphilis was dealt out in direct proportion to immorality and excesses, it would be different; but, in reality, the greatest sufferers from syphilis are by no means always the greatest sinners, and punishment often seems rather severe for the indiscretion or fault committed. Certainly no one will refuse his sympathy and pity to those who have innocently become infected with syphilis. Many of those who are themselves responsible for their misfortune are just as deserving of the physician's kindness and compassion, or even more so, since, owing to the necessity of keeping their sickness a secret from friends and relations, they may have nobody else but him to look to for a mite of the condolence and consolation so richly bestowed on those afflicted with other diseases—diseases which often are just as much as syphilis the consequences of reckless life and vice.

PROGNOSIS.

Syphilitic patients are great questioners. Not only do they understand how to shape their questions in such a way that they do not leave any loophole to escape a more or less direct answer, but they develop a wonderfully accurate memory in regard to the answers they receive from the physician, however easily and frequently it may fail them in relation to other matters concerning their syphilis. The large majority of such

questions will probably be in reference to the prognosis of syphilis, which naturally is of the greatest interest to the patient. Can I ever be cured? How long will it take before I can consider myself well again? Shall I ever be able to marry? Can I ever have healthy children? and similar problems, will the physician be asked to solve, and in most instances to solve quickly, without too long deliberation, otherwise the only too easily suspicious patient will begin to distrust his sincerity. It is therefore well to be prepared to answer these questions as promptly, as exactly, and as definitely as possible, and for that reason it is necessary not only to become well acquainted with the opinions of those who have the greatest experience and the widest acquaintance with syphilis, but also to adopt or form an opinion of our own, at least on questions of general bearing. Our knowledge of syphilis is still so essentially empirical that it requires experience, and long experience, to collect sufficient facts to develop a strong and settled personal conviction on any matter connected with it, and particularly so on prognosis. But that does not forbid that our opinion may gradually be modified according to our own observations, only it must have a decided shape at any given moment in which to be presented to the patient, so that it may not appear in an uncertain light to him. Between the extreme views of those who can not paint the picture gloomy enough, and those who are almost willing to consider syphilis a blessing in disguise, certain fixed rules and principles can be agreed upon for the guidance of our decisions. In the prognosis of the single case so many factors enter into competition for its modification that much greater freedom must be left to the individual judgment of the physician. The importance of syphilis for the patient, which has been amply considered in the preceding chapter, places the physician under the obligation to act with the same conscientiousness and cautiousness in making the prognosis which has been demanded for the diagnosis.

Value of Statistics.—Our knowledge of syphilis being formed almost entirely on experience, it might be inferred that statistics would play an important part in the decision of the leading questions. But, unfortunately, it is almost impossible to produce reliable statistics either from private practice or from hospitals. In the first line the enormous frequency of the disease and its distribution among all classes of people defy accurate estimation of the number of those who actually come at any one time under its influence. The long period over which syphilis usually extends makes it impossible for the physician to follow it over its entire course, or, one might almost say, through the entire lifetime of all or even a majority of his patients. Many circumstances will prevent the syphilitic from returning to the same physician with every recurrence of his syphilis, or to go to the same hospital whenever he is in need of treatment. A large percentage of syphilitic manifestations pass unnoticed by

the patient, or are overlooked or not recognized by physicians. The great variety of symptoms which do not reveal their immediate relations to the syphilitic infection, and the less typical character of many of the later manifestations, particularly of visceral syphilis, will largely contribute to the scattering of the patients among different observers. Statistics will therefore either embrace only a limited number of the cases that have come under the observation of one man or of one institution, or only a limited period out of the entire course of the syphilis.

Collective statistics, from which the best evidence would have to be expected, have been tried in several countries, but even they have failed in their results, partly on account of the enormous frequency of the disease, partly because the large number of mild cases soon withdraw from observation. Every patient who is fortunate enough to be able to conceal his infection will naturally take good care not to divulge his secret, thus leaving only less fortunate, more aggravated cases as the material for reports. Statistics furnished by life-insurance companies would be of great value, if we could feel sure that in every case the previous existence of syphilis is actually recorded, and has not escaped the knowledge of the insurers either from intentional concealment or from *bona fide* ignorance or lapse of memory. Public death records, from obvious reasons, in many instances will fail to indicate syphilis as the cause of death, even where its influence was a direct one, but still more so where it was responsible in a more indirect and secondary way. Statistics of hereditary syphilis based upon the records of public institutions, like foundling asylums, which, as a rule, receive their inmates from among those classes whose circumstances in life furnish the least favorable conditions for their offspring, can not be considered as fair or absolutely accurate. Therefore it must be admitted that all statistics, from whatever source they may be drawn, have relative value, and are available for the prognosis but in a limited degree. Without any assistance from pathological histology, bacteriology, and from the experiment on animals, we then have nothing left for our guidance in the consideration of the probabilities of syphilis but the aggregate experience of the medical profession during several centuries, and the opinions of those who have had the greatest opportunity to test the correctness of traditional doctrines by their own observations.

Change in the Character of Syphilis.—These opinions in the course of time have not remained unaltered, owing partly to better means of observation and to the general progress of medicine and its auxiliaries, partly to the undoubted changes in the character and in the course of the disease itself, since at the end of the fifteenth century it first appeared in Europe or began to attract general attention. It is probable that such a metamorphosis is still and constantly going on. Mauriac (*Archives générales*, November and December, 1892: *Étude sur le Pronostic de la*

Syphilis d'après la Solidarité de ses Manifestations) feels convinced, for instance, that tertiary diseases of the bones are now less frequent than twenty years ago. In speaking of the alarming increase at the present time of syphilitic affections of the nervous system, he significantly puts the questions whether these conditions really develop more commonly now, or whether they were formerly just as frequent and only failed to be recognized in their relations to syphilis. But this very increase of nervous troubles, now attributed to syphilis, compels us to depict its prognosis, at least in regard to the duration of life and the restoration of health, in much less favorable colors than we should have been justified in doing twenty-five years ago.

It is not the place here to enter upon the investigation of the possible causes of this change; whether treatment, attenuation of virus, diminution of predisposition, or increased power of resistance play a part, is impossible to decide. Certain it is that rarely, at present, do we see a case of syphilis go with regularity through all the conventional stages of its development. But it is just as rare to see a case of syphilis allowed to go without any treatment. Ever since, at the end of the fifteenth century, syphilis became the common property of the entire civilized world, energetic therapeutic measures have been adopted in order to remove its manifestations, mitigate their character, and destroy or eradicate its virus from the human organism. It is therefore almost impossible, in approaching the study of prognosis itself, to entirely eliminate the *influence of treatment* from the course and from the consequences of the disease. For centuries the opinion has almost universally prevailed, and to a large extent is held to-day, that syphilis, if left to itself, will inevitably run through the secondary stage with its more superficial lesions, gradually invade the deeper and more important organs, and finally culminate in the destruction of some organ necessary for the continuance of life. The absolute correctness of this opinion, however, is denied by a number of eminent and experienced observers, who claim that, in many instances at least, and under favorable circumstances, the disease has the tendency to limit itself, and even to die out without any treatment. Diday, who with Zeissl is the principal champion of this doctrine of self-limitation, has put it to the test in a series of forty-three well-established cases. In twenty-six of these no general symptoms of serious character or tertiary manifestations had ever been observed, and the patients were apparently in perfect general health; in eighteen the period of surveillance had extended from three and a half to sixteen years beyond the disappearance of the last manifestations of the disease. In the remaining seventeen cases, however, more serious affections, partly of secondary, partly of tertiary character, had threatened the destruction or impairment of important organs, so that finally treatment had to be resorted to. This

quasi-experimental proof of Diday's finds more or less confirmation in the experience of others, particularly of Taylor, who have seen patients in apparently perfect health but bearing unmistakable marks of former manifestations of syphilis, who were totally unconseious that they ever had such a disease as syphilis, and had never undergone any treatment for these affections. We shall further find results not much different from Diday's, if we select a certain number of syphilitic patients who are subject to judicious and sufficiently long-continued treatment, and who faithfully submit to all the regulations of their mode of living ordered by their physicians. In a number of them, after the first general eruption, no secondary symptoms will ever again appear, or only very slight affections of limited distribution will be observed. In others the disease will seem to be less controllable by treatment, and will again and again return in more aggravated manifestations, often for several years, and finally cease to show any signs of activity, leaving the patients in a perfect state of health. Such patients may be found to be free from any further trouble for ten or fifteen years or longer, to marry, and to become the parents of strong, healthy children. It is difficult to honestly claim that the final good result and the continued immunity from syphilitic manifestations are the effects of the treatment alone, without acknowledging the possibility or probability that there existed in the disease itself the tendency to exhaust its power and to become extinct. The question may then be asked in every single case that has received treatment, Would not the course of the disease have been the same if no remedies at all had been given? It seems impossible to give an unqualified negative answer, considering the unassailed fact that, under whatever circumstances, different cases vary greatly in severity. In the face, however, of the powerful and prompt effect of specific drugs on the manifestations of the disease, which in the majority of instances follows almost with the regularity of a physiological experiment, it seems but just to claim for our therapeutic measures a large part of the good results and of the final disappearance of the disease, the more so as the experience with untreated cases is but very limited. Zeissl, who agrees with Diday on the principle of noninterference, avows that in practice he has but rarely acted upon it; in the hospital, because, for economic reasons, it was desirable to enable the patients to return to their work as quickly as possible; in private practice, because they were not satisfied with the long delay in the disappearance of their symptoms. It will therefore be more in accordance with the actual facts to consider the prognosis of syphilis under the influence of appropriate treatment, without denying the tendency to self-limitation.

By far the most important question is, *whether there is a complete and absolute cure of syphilis*, or rather, whether the virus of syphilis

ever becomes totally extinct or is eliminated from the organism of a human being that has once been infected with it. We have seen that a certain number of syphilitics after a certain time will remain free from all manifestations of the disease and apparently in perfect general health. There is no reason to doubt that they may continue forever in the same condition; nevertheless, we can not pronounce them as absolutely cured, and we have no right to guarantee the continued immunity under any circumstances, because, unfortunately, neither the most minute examination nor microscopic nor bacteriological tests, nor the experiment on animals under the present state of science, afford us any means to prove the absence of the syphilitic virus, whatever that may be. The non-inoculability of syphilis on other but human beings makes it doubtful whether we ever shall be able to divest syphilis of its sharpest sting, of its direst curse, its *uncertainty*. Nevertheless, we can safely affirm, and I believe with the consent of the majority of acknowledged authorities, that *syphilis is curable* on the strength of the indirect proof afforded by *reinfection*. It stands universally admitted that a person who has become infected with syphilis and has developed signs of the infection, will be immune against the further inoculation of the syphilitic virus. If, therefore, such a person develops for a second time a distinct primary sore, which after a period of incubation is followed by secondary symptoms of the same character, as usually observed within a certain time after infection, it can rightly be asserted that this person must have been absolutely free from the influence of its former infection at the time immediately preceding the second infection. There can be no doubt that cases of such a real reinfection have been observed and do exist; although only a very small percentage of all the reputed cases of reinfection which have been published can be accepted as such after scrutinous investigation. Enough remain to establish the fact that persons who were infected with syphilis may lose their immunity against a new infection—certainly a proof that the influence of the syphilitic virus is not unlimited. Although of doubtful practical value for the reinfected person, and although not applicable to the decision of a single given case, it establishes the general fact that an absolute deliverance from the syphilitic infection is not only possible, but actually occurs in a number of patients. For, admitting even that such an absolute cure is an exception, it can not reasonably be pretended that all the exceptions will expose themselves to a new infection, or are bound to acquire the disease for a second time; a certain number of actually cured people must, therefore, always exist, although we can not recognize the fortunate ones. But it is certainly a great consolation that we can conscientiously assure our patients that a cure is possible. It can be asserted with equal right that such complete extinction of the syphilitic virus may take place at a comparatively early

date, since several cases of reinfection have been observed within a few years after the first general outbreak. Even with the *curability of syphilis* established, enough remains to render it a very *serious disease*, and to justify the abhorrence in which it is generally held. In the first line *every syphilitic infection involves the appearance of a certain number of symptoms*, however mild a course it may take.

The *primary stage is inevitable*; the initial lesion always exists, although it may be so insignificant that it can be occasionally overlooked. The indolent enlargement of the neighboring lymphatic ganglia will be missed but very rarely. The primary symptoms may disappear before secondary manifestations set in, but in the majority of cases they will extend their existence more or less deeply into the secondary period; remnants of the induration and of the swelling of the glands sometimes outlast several recurrent eruptions of secondary symptoms.

The *secondary stage is equally constant*. It is true that there are a few cases on record in which no secondary symptoms have ever become manifest; these observations include several of the rare cases of experimental chancres which were produced by inoculation of syphilitic secretions on human beings (Rinecker, Anonyms from the Palatinate). Their number, however, is so small that they must be considered as exceptions to the rule and do not affect its validity. Secondary symptoms may entirely cease to appear after the first general eruption, which follows the clonic period of incubation, but usually they recur in more or less prolonged intervals. The syphilides are particularly prone to recur with some regularity in the shape of well-defined periodical eruptions; while the affections of the mucous membranes are far less regular and more likely to persist for longer periods with varying intensity, where previous disposition and local irritations favor their development. Affections of other organs are much more irregular in their appearance. Secondary symptoms in the majority of cases will disappear within from twelve, fifteen, or eighteen months to three years after infection, never to return, leaving the patient in good or perfect health. In localized and more or less fragmentary form they may continue much longer, extend into the tertiary stage, and intermingle with its symptoms.

Tertiary syphilis is a much less constant consequence of the infection than the preceding stage; a large majority of the patients undoubtedly escape it. Its frequency changes considerably under different circumstances, so that reliable statistics are difficult to obtain. Mauriac estimates for Paris that not less than five nor more than twenty out of one hundred patients reach the tertiary stage; five to ten or ten to fifteen per cent will come very near the truth. Other authors do not differ very much in their opinions. Twenty per cent seems to be almost universally acknowledged as the extreme limit. In this country, by many physicians

syphilis is held to be of a mild type in general, and a smaller prevalence of tertiary symptoms might then be expected. My own experience does not indicate more favorable conditions than those reported from other countries. The highest proportions of tertiary affections is found in hereditary syphilis; almost equally unfavorable conditions are observed wherever syphilis invades a community or a territory heretofore unoccupied and forms an endemic focus within its limits. In regard to the period after infection at which tertiary symptoms begin to develop, opinions somewhat differ. It is certain that they may appear within the first years, and even within the first months, particularly in hereditary syphilis. In exceptional cases they have been found forty, fifty, and sixty years after the chancre. Mauriac places the time of their appearance in the majority of cases between the third and sixth year. Haslund found by far the largest number within the first twelve years. Fournier (Congrès de Dermatologie et de Syphilographie, 1889), with an experience certainly not inferior to that of any one else, maintains that the relative frequency of tertiary syphilis rapidly rises from the first to the third year, reaches its highest point in the third year, then begins to fall rather rapidly and almost regularly from the fourth to the eleventh year, still keeping within rather high proportions. Within the next ten years, from the twelfth to the twenty-first, the downward movement continues, although somewhat more slowly, to assume afterward an almost uniform but very low level. In fact, within this period tertiary syphilis becomes very rare, and is but exceptionally observed after thirty years.

The *sex* of the patient does not seem to be of great influence, the tertiary cases being almost equally divided between males and females. In regard to *age*, the largest number of cases is observed between twenty-five and forty-five years; this seems natural, in consideration of the fact that the majority of infections will occur between twenty and thirty years. Although in tertiary syphilis the regularity characteristic of the secondary stage is more and more lost, it evidently shows an unmistakable preference for certain localities. The external and more superficial organs of the human body are the favorite seat; the skin, the mucous membranes, the subcutaneous tissue, and the skeleton, among the bones principally those of the cranium, those of the nose and pharynx, and the superficial bones of the extremities, with the tibia in the lead, and the genital organs, following in frequency of tertiary lesions. Among the internal organs, without controversy the nervous system claims first place, overshadowing the others by their frequency, their importance, and often by their precociousness. Fournier even places the nervous system at the head of the list, with 1,085 out of 3,429 cases of tertiary syphilis against 787 affections of the skin, 612 of the mucous membranes, 428 of the subcutaneous tissue, 336 of the osseous system,

and 157 of the sexual organs. Other authors, on the contrary, while admitting the wide prevalence of tertiary syphilis of the nervous centers over other visceral lesions, have observed in the majority of cases affections of the external and more superficial organs. Haslund, for instance, among 514 cases has but 133 lesions of the nervous system against 290 of the skin, 131 of the bones, and 96 of the mucous membranes.

Tertiary syphilis in general begins without any prodromata, and often in a quite obscure manner; nor does it show, by any definite signs, where it ends. Its manifestations may heal, either spontaneously or under treatment, almost always leaving some loss of substance or some irreparable functional trouble, and may not be followed by others. Or they may continue indefinitely either in one favorite locality by healing on one place and by spreading in the periphery, mostly in one direction or by recurring in similar form on new places. Some defy all treatment, finally affecting the general health in a more or less pronounced manner, or destroy life by attacking some vital organ.

Within these general outlines *syphilis* may present a *widely different* picture, according to the *degree of intensity* with which it attacks the human organism, or according to the power of resistance which it encounters. Syphilis may be benign or malign, mild or severe; it may preserve a mild character throughout its entire course, or may change from the mild to the severe, and *vice versa*. Benignity principally shows itself by the appearance of the symptoms in that form, order, and manner which is considered *quasi* as normal and regular, because it is observed in the majority of those cases which, treated or left alone, after a more or less extended run end favorably. Benignity, therefore, includes mild, moderate, and even severe cases, according to the number, distribution, duration, and seat of the lesions, the length of intervals between the recurrences, and the resistance offered to treatment. The same factors determine the degree of malignity, which in general consists in the irregularity of the course, the early and continued appearance of more deep-seated and more deleterious lesions which usually are met with at the later periods, the accumulation of symptoms on different organs, and particularly in the formations, immediately or soon after infection, of lesions similar in character to those which generally are observed in the tertiary stage, particularly of the ulcerous syphilide.

The difference in degree of severity becomes manifest in the primary stage: an unusual amount of induration, great tendency to ulceration and phagedenism, represent the aggravated and malign forms of the primary lesion; while slight induration, absence or superficial nature of ulceration, and rapid cicatrization are signs of benignity. The swelling of the lymphatic glands does not seem to bear any definite relation to the severity of the primary lesion; in phagedenism it may be very slight. Suppu-

ration is not a sign of malignity, but is always a complication of syphilis with another infection.

The period of incubation between the appearance of the primary sore and the general eruption of secondary symptoms is usually shortened in malign cases; the prodromata, particularly the accompanying fever, do not seem to bear any definite relation to the severity of the disease; anaemia is often quite conspicuous in cases which finally follow a mild course, nor does the abrupt outbreak of the secondary eruption necessarily indicate a severe form of syphilis.

In the secondary stage itself, the syphilides, the most common and earliest manifestations reflect the mild or severe character of the disease by the degree of infiltration of the cutis. From the macular syphilide, which even in its most superficial forms is marked by a certain amount of cell proliferation, and from the slightly scaly, flat, small papule, the infiltration is found to increase in consistency, extension into the deeper layers and in the periphery, until the broad, hard papule or the more tubercular infiltration and nodules are produced. While all the mild forms have the tendency to entirely disappear, at least as far as microscopical examination is able to distinguish, generally within a short time, the more aggravated lesions leave a more or less intense pigmentation, sometimes quite persistent, or permanent scars of a quite pronounced type. The pustular syphilides, although in themselves indicative of a more severe infection, evince a decided difference in the intensity of the process, transitions being met with from the small pus-containing blister through its modifications to deep ulcers, without a sharp dividing line between secondary and tertiary forms. Suppuration, however, is often due rather to a secondary infection with pus-producing microbes of previously existing lesions of perfectly benign character, and under such circumstances is without significance for the prognosis. In general, the outlook becomes less favorable the more the syphilides approach the gummatous condition with its tendency to softening, peripheral propagation, and disintegration rather than resolution.

In a similar manner the affections of the mucous membranes vary in depth of infiltration and tendency to ulceration; here, too, the line of demarcation between secondary and tertiary lesions may become indistinct. All the other more or less common symptoms, such as marked alopecia, affections of the bones (periostitis) and joints, of the testicles, iritis, general enlargement of lymphatic ganglia, etc., are indications of a more aggravated type of disease.

The appearance of tertiary symptoms must likewise be considered in itself as sufficient evidence of a greater virulence of the syphilitic infection. Their prognosis largely depends on the inherent vital importance of the organs in which they develop. Naturally, it makes a great difference

whether the gummatous process invades the skin, or a bone, or the iris, or the adventitia of a cerebral artery. But the character of benignity or malignity is also demonstrated by the area involved, by the rapidity of the development, and particularly by the quality of the newly formed tissue itself. Usually the product of the tertiary process is somewhat unstable; it shows great tendency to softening or cheesy degeneration and to necrosis, involving the ulceration and sequestration of bones. Occasionally it assumes a greater consistency and stability, and, after attaining a certain volume, loses the tendency to increase, and may remain unchanged for a long time. Where it assumes the shape of a well-defined tumor it closely resembles sarcoma or other more or less malignant new growths, not so rarely even under the microscope. In such cases the general prognosis assumes a much brighter aspect if the syphilitic nature is recognized, because the syphilitic tumor, although representing a severe type among its own kindred, opens much more favorable prospects for the results of treatment.

The influence of therapeutic measures on the products of tertiary syphilis is also of great importance for the distinction of the benign or malign character of the disease. In many instances they readily yield to iodides; in others, mercury shows itself more useful, and just as powerful and reliable as in the earlier stage. It is remarkable how rapidly even the most dangerous and precarious conditions sometimes give way to either remedy or to combinations of both. In other cases, however, sometimes of apparently milder types, the effect of treatment may entirely fail to show itself, and the morbid process goes on unaffected by the most persevering and skillful efforts to stop its progress or to remove its products.

The question, on *what this difference in the character of syphilis depends*, what contributes in the single case to its benignity or malignity, is as important as it is interesting, and to a certain extent difficult to answer. Undoubtedly different factors must be held responsible, but for every one such numerous exceptions will be found that it is impossible to accept any strict rules.

It seems plausible enough to ascribe the difference in the course to *different modifications of the virus itself*, as several authors have done. Our deficient knowledge of the nature of this virus so far absolutely precludes any exact proof of such a theory, much less is it borne out by experience. But recently a French writer has tried to prove the individual virulence of syphilis by an observation which showed that a number of healthy males, one after another, contracted syphilis from the same woman, who herself had never presented a severe type of syphilis, and all perished within a few years from general paralysis, which could clearly be traced to their infection. Such an example, although of great

interest, is so exceptional that it has no convincing significance. The attempt to show a difference between infection from a primary sore and from secondary symptoms has not been successful either. Others, principally on theoretical reasoning, have sought the cause of malignancy in the large quantity of syphilitic virus (or the large number of microbes) introduced into the organism at the time of the infection; but experience distinctly establishes the fact that it may require but the smallest imaginable quantity of the secretion of some syphilitic sore to produce the most disastrous forms of syphilis.

The least doubt exists about the malignancy of *hereditary* syphilis, although even against this rule numerous exceptions can be brought forward. Much more doubtful, it seems, whether syphilis contracted from a hereditary syphilitic source has a great tendency to produce more serious results, as has been claimed by some authors. The *age* at which a patient becomes infected with syphilis is certainly of some influence on the character of the disease. Children, who acquire it at a very tender age, according to Bäumler, are exposed to almost the same danger as those who inherit it; this, however, is denied by others, who claim to have observed the opposite condition. External circumstances, as poverty, want of care and good nourishment, may contribute a good deal to aggravate the influence of the infection itself, and this may account for the discrepancy of opinion. It must be conceded that the symptoms appear in a more acute character and follow each other in shorter intervals, owing to the greater activity which is peculiar to physiological as well as to pathological processes in children, but thereby the entire course of the disease becomes shortened and less detrimental to general health. With advancing years, particularly in children from ten to fourteen years, the conditions seem to be favorable in general; at least in my own experience, a number of such cases have hardly manifested any secondary symptoms at all. In elderly people, however, and particularly in those who are approaching or have entered the senile age, syphilis assumes more aggravated forms. The reactionary effort of the whole organism against the invasion of the morbid agent, and the combined action of the healthy forces to get rid of the invader—which really seems to be the meaning of the general eruption following infection—can not be produced in so vigorous a manner by the waning energy of the aged, therefore it takes longer to overcome the effects and to free the blood of the poison. Hence, the symptoms develop more slowly, persist longer, either by frequent recurrences, or by extending to deeper layers of tissue, thus often approaching tertiary forms. Nevertheless, after a certain time, the syphilis of the aged may entirely disappear like that of youthful patients, and the danger of the development of visceral affections seems to exist only in a small degree.

The *sex* of the patient plays, too, a certain part, perhaps more in shaping the outward features than in determining the intensity. There is hardly a doubt that in females oftener than in men syphilis pursues a very mild course—so mild, in fact, that it is liable to be entirely overlooked. Anæmia, functional troubles of the nervous system, as headaches, neuralgia, etc., prevail, and often conceal the syphilitic infection. It is not improbable that roseola and the mild papular syphilide occur much oftener in women than they are actually observed by them, because they have less occasion to expose themselves to inspection; this can be said with more right even of the primary lesions of the sexual organs. Physiological conditions peculiar to the female—menstruation, gravidity, climacterium—do not seem to interfere much with the course of syphilis; and the internal organs of reproduction themselves, the uterus and the ovaries, with the exception of primary lesions on the former, are probably the least affected organs in syphilis. It ought to be expected, at least, that the wholesale extirpation of these organs at the present age should have brought to light numerous specimens of syphilitic ovaries or syphilitic endometritis or gunmata of the uterus, if they existed; still, we hear very little of such occurrences. Gravidity occasionally seems to be accompanied by exacerbations of syphilis; abundant loss of blood during menstruation is due more to the anæmic condition and the malnutrition incidental to syphilis than directly to the disease itself. That the female sex is not exempt either from severe and malign forms in general, or from tertiary symptoms in particular, is proved by numerous observations. The statistics of Haslund and Fournier show but very little difference in the distribution of tertiary cases among both sexes.

As to the *seat of the primary infection*, numerous observations seem to have furnished proof to some authors that extra-genital chancres are more regularly followed by serious symptoms, those of the fingers being regarded the most dangerous ones. In conformity with that of many other physicians, my own experience does not confirm that rule. To my surprise, I have observed in a considerable number of cases a mild course of syphilis, chancres of the lip and face being most frequently represented. On the genitals themselves it matters little whether the chancre is situated on the prepuce, the frenulum, the glans, the sulcus coronarius, the orifice of the urethra, the labia majora or minora, etc., the local symptoms only, and probably the swelling of the glands, being more dependent thereon.

The influence of the *constitution* and of the condition of the *general health* of the patient at the time of infection on the course of syphilis is much more definite, not so much perhaps on the number and character of the secondary symptoms as on the final result. It seems but natural that in a healthy organism, with all its functions in good working order,

the combat against the syphilitic virus should be fought with greater energy than in a weak one, but that in the end the former will be better able to free itself of the intruder without any permanent detriment, than the latter, in which the progress of the disease may be less vehement, but so much more insidious and persistent.

It is not uncommon to recognize a predilection of the syphilitic process for those organs which, previous to the infection, showed a local weakness or predisposition to readily succumb to other morbid agencies. Patients, for instance, who were habitually subject to tonsillar and other throat affections are particularly liable to suffer from severe attacks of throat syphilis, and rheumatics will more easily develop specific joint affections. Fournier but recently has maintained that the large number of syphilitic nervous disorders is due to a disposition, either from inheritance or from other causes, to develop nervous troubles, and that syphilis is only one of the immediate or accidental causes, although a frequent one, which favor or precipitate the outbreak of the latent tendency which would sooner or later have manifested itself even if the patient had not become syphilitic.

A decidedly disastrous result must be expected in those cases in which syphilis *complicates other constitutional diseases*, particularly tuberculosis and scrofulosis. Malaria is almost unanimously acknowledged as largely favorable to the development of malignant and protracted syphilis, principally tertiary symptoms.

It is evident from the foregoing why the *habits and mode of living* of the patients have much to do with the character of syphilis; why irregularity of life contributes a good deal to the severity of the disease, and excesses in *Baccho et venere* are largely responsible for disastrous results of the infection. Excitement in business, cares and troubles of all kinds, overwork, particularly excessive brainwork, often associated with want of sleep, increase the danger from syphilis. On the other side, it can be easily observed that regularity of life and habits, moderation in pleasure as well as in work, sufficient sleep, conscientious attendance to all the wants of hygiene, and regulation of all the animal functions of the human body, and a certain amount of philosophy in accepting the responsibilities of the infection and in submitting to the inevitable, greatly tend to mitigate the bad influence of the infection. If a patient, by the consideration of his syphilis, is induced to give up reckless living and dissipation, he may indeed find himself in better health after his syphilis than he probably would have been without it; and it may indeed become true that syphilis exerts a wholesome influence on a person's health and entire life, and in this sense may prove to be a blessing in disguise. Unfortunately, such cases are not the rule, and too rare to affect the prognosis of syphilis in a great measure.

As to the use of *tobacco* in its different forms, there can be no doubt that it may often aggravate affections of the mouth, tongue, and throat by the incidental local irritation, and a total cure of these symptoms is often impossible until the habits of smoking and chewing are entirely given up. Excessive smoking may exert the same injurious effect on the nervous organs in syphilitics as in nonsyphilitics, while moderate use will hardly be considered as harmful in regard to the course of syphilis. Whether the moderate use of *alcoholics*, particularly of the milder beverages such as beer and wine, is likely to unfavorably affect the course of syphilis, seems open to some doubt; it can not be ascertained that, in countries where drinking is an almost universal habit, syphilis is a more serious disease than in others where this is not the case, because it is impossible to find any large territory where alcoholic beverages are not used to a certain extent, whether openly or clandestinely. It seems, however, injudicious to suddenly enforce total abstinence on a person, who has been taking moderate quantities of alcohol for years, as soon as he is infected with syphilis; it would seem rather to add another weakening factor to that represented by the disease, and to render the organism less able to combat the virus by the withdrawal of one of its regular means of support. The effects of stronger liquors on the nervous organs, the liver and kidneys, are too well known to admit of much doubt that they ought to be avoided as far as possible by syphilitics.

As the last of the factors which contribute to the character of syphilis we have to consider the effects of *treatment*. There will hardly be any objection to the statement that a judicious, methodical, and sufficiently long-continued treatment not only causes a quicker disappearance of the symptoms actually present, but is able also to prevent their recurrence, to reduce their severity, and to considerably shorten the active period of the disease itself in those who apparently get well. It is, however, by no means irrelevant at what period treatment is commenced. The temptation to begin it before the appearance of any secondary symptoms is certainly often very great, but the suspicion seems to be well founded that the early treatment favors a more irregular course of syphilis, and as a rule does not prevent but only delays the secondary symptoms, which then have a tendency to appear in an aggravated form. With every year I find the impression gaining upon me that the initiation of treatment during the period of incubation not only does not offer any advantages but does positive harm. Delayed treatment, or the too early cessation of it, is undoubtedly equally responsible for numerous cases of aggravated and recurring secondary symptoms, and greatly favors the development of tertiary conditions. Cases in which obstacles arise against the regular application of the usual remedies, either from the intolerance of the stomach or from injurious effects upon the general health, usually offer great difficulties

and severe symptoms. If mercury alone is not tolerated, sometimes the iodides may be sufficient to check the course of the disease; but occasionally the organism refuses to bear either remedy, and unless circumstances afford the advantages of favorable climatic, dietetic, and hygienic measures, we see the patient go from bad to worse, in spite of all our efforts to stop the progress of the disease.

Syphilis is *not* a disease which ordinarily *causes much pain* or direct *suffering*, not, at least, in the primary and secondary stages; much oftener it becomes a source of inconvenience and embarrassment if the situation of the lesions betrays the presence of some disease, and, to the knowing ones, its nature. Primary sores on the genitals are not generally very painful unless they are neglected, or unless they are deeply ulcerated or phagedenic; in the latter instance the pain may be intense and of neuralgic character. In extra-genital chancres much depends on their seat. On the lips, the tongue, the tonsils, and on the eyelids, they may cause great inconvenience, and often pain, not to speak of the offensive aspect of all such lesions in the face, particularly of women. Neuralgic pains through the entire extremity have not infrequently been observed in chancres of the fingers. The syphilitic bubo is but seldom really painful; a certain sensitiveness, particularly after rising from a sitting position, or after a long walk, is not unusual.

The general symptoms preceding and accompanying the outbreak of the first secondary manifestations may become quite severe, by the intensity either of the fever or of the rheumatoid pains in the chest or of the headache, but, as a rule, for a short time only, relief following almost immediately on the commencement of treatment or spontaneously. The syphilides of macular and papular character, as a rule, do not cause any sensation, neither itching nor pain; moist papules or broad condylomata around the anus, on the scrotum, and on and around the external female genitals, may become very sensitive and painful, the more so the more the rules of cleanliness are neglected. The pustular and ulcerating forms, as long as they are covered with crusts, do not cause great inconvenience, but if unprotected and allowed to stick to the clothes and on the localities where two surfaces come constantly in contact, as in the anal region, on the scrotum, in the axillæ, on overhanging breasts, between the toes; or which are exposed to friction from the clothes, as above the heel, on the knee, on the wrists, etc., they often become the cause of intense suffering.

Throat affections may be almost entirely painless, but in the majority of cases are accompanied by difficulty and soreness in swallowing; the sensitiveness sometimes becomes more pronounced when the ulcer begins to free itself of the necrotic tissue and to expose a more healthy granulating surface. Tongue and lip affections even of superficial character are usually quite sensitive, particularly during eating, and occasionally render

chewing almost impossible. Bone and joint affections are often accompanied by pain, principally at night, and by great sensitiveness against even the slightest touch or pressure. Iritis, finally, in the majority of cases, is painful, and necessarily always the source of some inconvenience on account of the inability of using the eye.

The tertiary affections of the skin and subcutaneous tissue are not, as a rule, connected with pain, unless it depends on their seat, while those of the mucous membranes are more liable to cause distress, those of the tongue in particular. Diseases of the bones of the nose and palate, which often lead to perforations and other defects, are among the most afflicting symptoms; but the most deplorable condition is that produced by the disfiguration of the shape or by ulcerative defects of the nose, and of the face in general. The "dolores osteocopi" accompanying affections of the bones of the cranium or of the extremities are generally quite severe and exasperating, the disturbance of the sleep rendering their effect particularly grave. Visceral affections may cause but very few subjective symptoms, but ordinarily do not differ much in this regard from similar affections resulting from other causes. Those of the nervous organs, however, including troubles of peripheral nerves, naturally imply much more severe subjective symptoms, and are the source of intense suffering. The peculiar ulcerative processes of the rectum due to syphilis, with the obstruction of defecation, must also be mentioned as among the most painful affections; while gummata of the testicles are distinguished from other new growths by their indolence and absence of subjective suffering.

The general health, as we have already had occasion to mention, may be left entirely unimpaired by syphilis, and many patients are finally restored to the full enjoyment of health and life. But in a large percentage of cases the *disease leaves its mark on certain parts of the body* either in the shape of some loss of substance or of some functional disorder, or produces a low state of general nutrition. The anæmia and cachectic condition often observed in the early stages, principally in women, may entirely disappear, or may return with every new eruption of symptoms, or may become more or less permanent, outlasting sometimes all the actual symptoms of the disease itself. In this way a not very conspicuous but nevertheless deeply rooted weakness of the entire body may remain for life, implicating a reduced power of resistance against other morbid agencies, and increasing the danger resulting from other diseases. More decided marasmus or pronounced syphilitic cachexia is observed either as the only symptom after long duration of the disease or as a complication and sequelæ of visceral syphilis, or long-continued and ulcerative and suppurative processes in the external integument or of the bones.

Locally, the influence of syphilis is observed in various ways. Primary lesions on the genitals in most instances are without much importance;

deep ulcerating chancre may cause some disfigurement, particularly of the glands, but phagedenic ulcers may cause horrible destruction of the penis, even so as to render it unfit for some of its functions, and to necessitate operations for the restoration of natural micturition. Extra-genital chancres often leave ugly and unsightly scars on the eyelids; with the more serious conditions of entropion and ectropion, scars on the finger-tips may interfere with the tactile usefulness of the fingers.

Among the secondary symptoms, iritis must be named first in importance on account of adhesions and their disastrous tendency to inflammatory processes and permanent impairment of the functions of the eye. Superficial skin affections leave only pigmentation for a more or less extended period; some of the papular syphilides leave superficial scars; but the pustular eruptions as well as the precocious ulcerative forms produce permanent and more conspicuous scars. Leucoderma syphiliticum is generally of great persistency, and by its principal seat on the neck and shoulders of women may often become inconvenient and disfiguring. Defluvium capillorum may lead to permanent premature alopecia, or leave the hair at least much thinned. The affection of the mucous membranes are not without serious consequences; chronic catarrhs, thickening of the mucous membranes, or the dry atrophic condition of the posterior wall of the pharynx, and particularly loss or impairment of the voice resulting from larynx affections, may remain. Leucoplakia of the tongue and oral cavity often follow syphilitic lesions. Early periostitis causes permanent thickening and rough surfaces of superficial bones, mostly of little practical importance.

By far more conspicuous are the permanent sequelæ of tertiary lesions. Scars on the outer integument are the most numerous, owing their importance almost alone to their seat; those of the face and other exposed parts naturally are the most disagreeable ones. On the legs the gummatous process frequently produces ulcers which become permanent, and after a while can hardly be distinguished from the ordinary ulcer of the leg, all the disadvantages of which they share. More deeply seated gummata cause more or less extended necrosis of the bones, which is often found on the cranium; on the extremities they may render the patients invalid forever. Perforations and other destructions of the nose and palate, pharynx and larynx, are among the most dreaded consequences of tertiary syphilis. Visceral syphilitic affections hardly ever admit of a permanent cure; although they may apparently heal, certain changes in the structure will always remain, which not only render the functions of the organs imperfect, but also favor the recurrence of trouble on the slightest provocation. This is particularly true of the affections of the nervous system; their prognosis is always an uncertain one. Nevertheless, in visceral lesions resulting from syphilis, and mostly again in affec-

tions of the brain and spine, as in epileptiform convulsions, in different forms of paralysis, aphasia, tumors, etc., not less in lung syphilis, the prognosis becomes relatively better than if the same or similar symptoms are due to other causes, because there is always a certain hope left that antisypilitic treatment may be followed by the partial or complete disappearance of even the most dangerous conditions. Often, however, the effects of the treatment are not so favorable, the less so the more the anatomical structure of the organs has been interfered with.

Of particular importance is the effect of syphilis upon the *procreative faculties* of *sypilitic parents*. The influence of local manifestations of the sexual organs is comparatively small. We have stated already that the uterus and the ovaries are rarely affected by syphilis; it seems as if the faculty of conception was not interfered with at all. In many cases we find that a new pregnancy follows an abortion or premature birth after a very short interval, and the number of miscarriages recorded for a single woman is often quite astonishing. In the male, affections of the epididymis and testicle may and actually do produce azoöspemia; there are cases on record in which this condition was found to disappear under specific treatment, while in gonorrhœal epididymitis a cure is but exceptionally observed. Defects of the penis after phagedenic ulcers may cause impotentia coeundi. All these local influences, however, are of little consequence compared with the conveyance of the syphilitic virus to the fœtus.

The only question which has to be considered here is whether *sypilitic parents can have healthy children* at all, and *how soon after infection* this may be expected. There can be no doubt that the effect of syphilis on the condition of the offspring usually wears out after a certain time. Syphilitic fathers are likely to produce syphilitic children as long as the active period of the disease lasts, and we therefore must not expect that before the end of the second or during the third year after infection their children will not show any signs of hereditary syphilis. Many instances are known where healthy children were born even within this period, but marriage ought not to be permitted or advised before the third year. On the other side, observations are not wanting that syphilis appeared in children long after the cessation of all symptoms on the father himself, and that after renewed treatment of the father healthy children were born. Syphilis of the mother affects the fœtus much more regularly and much more intensely than that of the father, and observations that children were born during the active period of syphilis of the mother and lived in healthy condition are extremely rare. Even where no manifestation of any kind can be detected, or where no outward symptoms have ever been observed, mothers sometimes continue for years to have miscarriages, stillbirths, either prematurely or at full term, or to

bear children with symptoms of hereditary syphilis. Nevertheless, the farther away from the third year after infection the greater becomes the probability that mothers will have healthy children. The birth of one healthy child does not assure the complete extinction of the syphilitic influence, since it is not so rarely observed that a miscarriage or stillbirth or a syphilitic child follows after it. Sometimes all the children of one sex are born healthy, while those of the opposite sex succumb to the disease, or healthy and syphilitic children alternate without any apparent change in the health of the mother. Tertiary syphilis of the parents is of much less influence on the health of the children, and parents with undoubted tertiary symptoms may have children entirely free from any syphilitic taint. It can not be denied, however, that such children may develop symptoms of serofulosis, and frequently those of rickets. Under such circumstances these diseases show no peculiarities of any kind which would reveal a connection with syphilis, nor are they open to the influence of antisymphilitic treatment. Unquestionable cases of propagation of syphilis into the third generation with immunity of the secondary hardly exist.

Hereditary syphilis leaves the most numerous and the most intense marks of virulence. In regard to the general health, we have seen that it often manifests itself by the poor development of the entire organism, which gives to its victims a more or less puerile appearance. Smallness of stature, the stupid expression of the face, the abnormal formation of the head and face, characterize many hereditary syphilitics, the malformation of the teeth, the affections of the eye and ear adding to their deplorable condition. Nowhere else are the destructive processes of the nose and throat observed so generally and in such disastrous forms, and no class of syphilitic patients furnishes so large a percentage of nervous affections. In both sexes sterility is not an uncommon occurrence due in the male to early affections of the testicle, and in the female to atrophy and defective development of the uterus and ovaries.

It has become sufficiently evident from the foregoing that syphilis produces numerous conditions which ultimately end fatally. It therefore can not be denied that *syphilis* in many cases has to be considered as the indirect *cause of death*. Visceral affections furnish the majority, those of the nervous system again taking first rank. They may cause death abruptly, mostly by apoplectic attacks due either to occlusion of arteries, rupture of aneurisms, and similar accidents, or may take a slow course, resembling that of tumors of the brain. The chronic affections of the spine, like tabes and similar forms, must likewise be considered as frequent consequences of syphilis with fatal result. Affections of the heart, lung, liver, and kidneys are also responsible for the fatal exitus in a number of cases. Marasmus with amyloid degeneration of the organs may be

the immediate and last cause of death after ulcerative processes of the skin and subcutaneous tissue and after chronic bone affections. Although it does not seem so difficult to trace the fatal result in many instances to its real source, it can safely be assumed that often the connection of the death with syphilis remains unrecognized. It is therefore very difficult or impossible to give any exact data of the actual mortality from syphilis.

Acquired syphilis but very rarely becomes the *immediate* cause of death. Fatal hæmorrhages from erosion of larger blood-vessels in ulcers have occasionally been observed, otherwise only the severity of the general eruption of syphilis may sometimes cause the death of individuals weakened by previous diseases or of feeble constitution, particularly if very tender or very advanced age add their influence. In hereditary syphilis, on the contrary, the direct mortality is very great, although it is almost equally impossible to give exact numbers. It can be stated without hesitation that a large percentage of syphilitic children perish during intra-uterine life, while out of those who are born alive a great majority die within the first year. Considering the wide distribution and the great frequency of syphilis, it seems quite obvious that it must exert a vast influence on the vitality of entire populations. In France it has been publicly recognized as an important factor in the depopulation of that country.

It remains to consider how far it is possible to shape the *prognosis in every single case from the symptoms* which it presents. Naturally the general conditions, which have been reviewed so far, must furnish the principal guidance for our judgment. Since we have seen that it is impossible to recognize any absolute laws, and that an opinion obtained from a large number of observations is often reversed by numerous exceptions, great caution is necessary that we do not allow our predictions to assume the appearance of absolute reliability.

The primary lesion more than any other symptom invites to a certain degree to draw conclusions as to the future course of syphilis. Erythematous chancres, superficial erosions with parchmentlike induration, are usually followed by superficial syphilides in the beginning of the secondary stage, but they do not exclude later ulceration or other tertiary processes. It has been the experience of many observers that cerebro-spinal affections occur more frequently after mild chancres with mild secondary symptoms. Ulcerous and phagedenic chancres are more regularly followed by ulcerous syphilis, not only of the skin and mucous membranes but also of the bones. Occasionally secondary symptoms may again succeed early tertiary symptoms. Visceral syphilis is less to be expected in such cases. Some authors consider voluminous induration as a sure sign of a severe course of the disease. They calculate that from such a source an abundant supply of the syphilitic virus would be distributed through

the blood and the entire body. This seems plausible enough, but with our uncertain knowledge of the nature of this virus itself the correctness of the theory can not be acknowledged. Other physicians, among them Mauriac in the above-cited memoir, deny this influence. The experience that, after the early and apparently locally successful extirpation of the primary lesion, syphilis of severe type has often developed, must not be overlooked. The swelling of the lymphatic ganglia is not of great importance, although the same theoretical reasoning might suggest the contrary expectation. Under no circumstances is it allowed to predict from the primary sore the course of the disease beyond the general eruption immediately following the period of incubation. In the secondary stage, the regularity which forms so characteristic a feature of syphilis is more prevalent than in any other. Accordingly, we may tell the patient that he is likely to have some throat affection or a new eruption on the skin, but of what character these manifestations will be is more difficult to say. A roseola returns but very rarely for a second time, and then usually at a late period; it is more probable that a papular syphilide will follow, but of a more or less limited distribution. Broad condylomata are comparatively less frequent in this country than in European countries, probably on account of the more general observation of the laws of cleanliness. Among the better situated classes of patients they are but seldom met with. Where they once appear they have great tendency to recur obstinately. Throat affections show the same inclination for recurrences within the first year, greatly favored by the inclement seasons.

The frequency with which certain symptoms on different organs appear simultaneously may sometimes allow the prediction from the appearance of one member of such a group the probable development of the other. The combination of a roseola crust on the hairy scalp and *plaques muqueuses* of the throat has been mentioned before. The coincidence of tongue affections with those of the palms and soles, and that of iritis with papular and pustular syphilides, are memorable examples of such combinations.

The cerebro-spinal affections are the least regular in their appearance, and do not seem to have any certain relations to other symptoms nor to the period in which they appear. Their form and severity are the same in the early period as in the later ones. The prolongation of the secondary period and the frequent recurrence of its symptoms are not of unfavorable significance for the final entire recovery and immunity from tertiary symptoms.

The irregularity and capriciousness of tertiary syphilis as to its topography, chronology, and termination, forbid almost every calculation as to its development and final course. Simultaneous affections on different organs usually bear the same character of benignity or malignity,

although they may appear under an entirely different form. Several peculiarities of some of the symptoms and their combinations are of certain value for the prognosis. Syphilis of the nose and pharynx is found, but rarely associated with that of the larynx; while laryngeal syphilis is prone to affect the trachea and the lung, the tendency to descend being manifest in the air-passages. Lung and liver are frequently affected at the same time; so are kidneys, spleen, and liver. A peculiar combination is that of paralysis of several muscles of the larynx and of the eye-muscles, sometimes with hemianæsthesia of the face, which probably can be traced to a common central affection. The frequency of such observations makes it imperative for the physician, in the presence of one of the symptoms to watch for the actual or future development of the other. In all cases of tertiary syphilis the prognosis as to their consequences principally depends on the seat of the lesions. In regard to the final termination no certain prediction can be made, and even under the most favorable circumstances we can not give the positive assurance that the definite end has been reached.

In looking back over all that has been said in regard to the probabilities of syphilis, at first glance the picture presented seems to be a rather gloomy one. We see a disease, which extends over an indefinite time, even under the most favorable conditions over months, involving usually but little suffering, but liable to cause permanent injury to single organs or to the general health, and indirectly becoming the cause of death in a number of cases. There is nothing to relieve the dark prospects of hereditary syphilis, which in a large majority of all cases becomes the direct cause of death, and among the survivors evolves its most malignant, dangerous, and fatal features, leaving so few favorable cases that they almost seem to be exceptions to the rule. But in regard to acquired syphilis the aspect becomes much brighter, if we reflect that almost all the serious and dangerous features are concentrated in tertiary syphilis; that only a certain percentage of all cases of syphilitic infections, probably not exceeding twenty per cent, are likely to reach the tertiary stage, and that out of these twenty per cent or less some are of benign character and amenable to a final cure, particularly under the beneficial effects of treatment. This leaves for the majority of all cases the prospect that after the development of a series of more or less severe symptoms, extending from a few months to two or three years, or sometimes longer, the disease will cease its activity and will become extinct without leaving any serious consequence. The uncertainty of this apparent cure remains as the most oppressive and pernicious feature of syphilis; while the generally ready and sure relief afforded by treatment greatly helps to redeem its character.

THE TREATMENT OF SYPHILIS.

By J. WILLIAM WHITE, M. D.

THE *materies morbi* of syphilis, as far as it is clinically demonstrable, consists of a serous fluid, in which are found a small proportion of floating particles, consisting of pus, epithelial cells, and granulations. This can only be once inoculated into the individual system, and, when so inoculated, produces in a short time symptoms that demonstrate its intense virulence and distinguish it from all other contagious or inoculable substances. To which of its constituents it owes its power we are not able to say dogmatically. Bacteriologists have not as yet proved the microbic origin of syphilis. To do this in the case of any disease the micro-organism must be found, isolated, reproduced in pure cultures, and inoculated on healthy individuals with the effect of causing the development of the characteristic symptoms. This has not been accomplished in the case of syphilis. And yet its analogy to other microbic diseases in which the source of contagion has been proved, and the recent researches of Bouchard and Chauveau, indicating that the severity of the disease is proportionate to the amount of infection, justify us in believing that this specific poison or virus owes its intense virulence to a micro-organism, or to the albumoses, toxalbumins, and other products of fermentation produced by microbic action.

Legislation in Relation to Syphilis.—In discussing the treatment of a disease which is thought to owe its origin to a pathogenic organism, a specific cause, modern science demands consideration of the possibility of preventing the spread of the contagion, or of eradicating it by destroying the source of infection. The contagious diseases acts of Great Britain, and the various laws of other countries for the restriction and regulation of prostitution, aim at accomplishing this purpose.

The testimony (which need not be recapitulated here) of Thiry, Kaposi, Neisser, Pizzisingskold, Neumann, and others, given at the Tenth International Congress, and the opinion of the profession at large in each country where they have been tried, constitute conclusive evidence of the prophylactic value of these measures. Neumann, in the following summary, formulates the essential requirements for success in the limitation of the spread of syphilis: "Prostitution should be under Government

control. There should be compulsory examination of all prostitutes. If diseased, they should be sent to special hospitals for treatment. During the early secondary period the most severe restrictions should be observed. Soldiers and sailors under Government control should have periodic examinations, early and prolonged treatment in hospitals, and should be kept under supervision after apparent cure." In addition, he urges the examination of factory hands and of wet nurses; the state regulation of vaccination and circumcision; the establishment of a large number of hospitals for syphilitics; and the passage of international laws regarding syphilis and prostitution.

It may be admitted that no method has as yet been devised which is in all respects unobjectionable or is capable of universal application. I may add here also that, while advocating the general principle of supervisory legislation as applied to prostitution, I am fully aware that in the details of every plan yet proposed there has been much that was defective or positively harmful, and that the subject is still one of the unsolved sanitary problems of the age. The direction in which action must be taken, and the general character of that action, may nevertheless be indicated if not demonstrated.

We may begin, without much fear of contradiction, by urging the necessity of a more general and more accurate public knowledge concerning the gravity and the prevalence of this disease. The innocent, who are also in this respect the ignorant members of the community, have claims which we, who seek to fulfill the highest function of our profession—the preservation of health, individual and national—can not conscientiously disregard. Every adult citizen should be aware, for his own sake, of the possibilities of contamination which surround him; every parent should be competent to protect his wife or children from all indirect infection through a servant or playmate, a household utensil, or a toy; every wife should know that by permitting the approaches of a syphilitic husband she herself becomes liable to the disease, and to the creation of a being which has few chances for life and still fewer for health or happiness; and every syphilitic should realize that, except after certain intervals and under proper restrictions, his marriage is an outrage to the woman he professes to love, and a crime against society.

Once let these facts be clearly understood and this information widely diffused, and an important step will have been taken not only in preventing accidental and guiltless contagion, but also in preparing public opinion for the legislative measures which are believed to be desirable. Another good result would in all probability be a diminution in the number of cases of this class of disease, who, in ignorance of the gravity of their ailment, consult the quacks and irregular practitioners who find here their favorite and most lucrative field. It is safe to say that the fees

of the patients with venereal disease annually maltreated by charlatans, advertising doctors and apothecaries, would comfortably support all those younger members of the profession into whose hands they ought naturally to fall, and who now undergo the usual and often unsuccessful struggle for existence.

For these reasons—first and especially the public welfare, and next our own personal interests—we should in every proper way encourage the presentation of this matter to the community at large.

Having as far as possible closed the accidental avenues of infection, we have to deal with the fact that, although many cases may thus be prevented, by far the most frequent mode of transmission of syphilis is through illicit sexual intercourse, carried on largely by means of a multitude of women who thereby earn a livelihood, and by a still larger number of men who furnish their means of support.

This fact has given rise in many countries to numerous efforts at legal control and supervision of the vice. The general fundamental principles which have been observed or advocated require the registration of each prostitute, her inspection once every week or ten days by a competent medical officer, her sequestration whenever she is found to have any contagious disease, and her retention until she is completely cured; together with, in some proposed laws, the examination of all immigrants before admission to the country, and their treatment and cure if found diseased.

The practical results of these repressive measures in Great Britain, France, and Russia, are fully considered in the article on Syphilis in Relation to Public Health.

In this country the experiment was tried in St. Louis, where the ordinance for controlling prostitution embraced something of the Parisian system, but was an improvement upon it in several respects. This ordinance, which was in force some years back, and then was repealed, gave the Board of Health and police department authority for the registration of all prostitutes, provided for their periodical examination by official physicians, and gave the power to isolate in the female hospital those found to be diseased. The women were compelled to pay a weekly stipend, which was expended solely for their benefit, and went to the support of their hospital. They were entitled to care in this institution not only when suffering from venereal disease, but also when sick from other causes.*

* "After this scheme had been in successful operation for a length of time, the point was raised, especially by the clergy, that this was nothing more than a licensing of prostitution, and therefore an infamous compact with sin and Satan. This class of moralists was re-enforced by others, who claimed that the physical explorations were a degradation to the sex generally, and insisted that these examinations should be extended to male offenders against morality as well. These various arguments the Legislature conceived to

It may be admitted at once that, if the total abolition of prostitution could be accomplished, it would be a consummation devoutly to be wished.

No one, however, in our profession at the present day believes in the possibility of attaining such an end. The accumulated experience of mankind constitutes a wall of unanswerable argument. All attempts at the extinction of prostitution present throughout the centuries one unbroken record of failure. Wherever this scheme has been tried, the sexual impulse, the strongest to which human nature is subject, has asserted itself, and other laws have been violated, other and graver evils have resulted. The remedy has proved worse than the disease. Seduction, illegitimacy, criminal abortion, and infanticide have invariably followed, and the total average morality of the community has been seriously impaired.

Constantine, Justinian, Louis IX of France, and Philip IV of Spain, at different eras in the world's history, attempted the repression of prostitution, and endeavored to enforce it with all the powers of army, church, and state at their backs; but in each instance the attempt was a conspicuous and a complete failure, as it was also in Austria, Bavaria, Rome, and Paris, where the same experiment was tried on different occasions.

Many of the evils which have arisen and still arise from the existence of the lower strata of prostitutes are unquestionably due to the persistent manner in which sanitarians, legislators, and society at large have ignored them—a behavior dictated by unreal modesty and unsound religion, and for which society has, through the devastation of preventable disease, been punished a hundredfold. The recognition of prostitution by the state for purposes of control does not in the slightest degree convey the idea of approval or encouragement, as is often asserted by those in opposition. Laws authorizing certain individuals to sell liquor upon the payment of stated fees, or after complying with definite requirements, do not compel those persons to engage in the liquor traffic, and can not be considered as promoting intemperance. They recognize the fact that liquors will be sold in spite of all efforts to the contrary, and endeavor to bring the evil within proper limits by forbidding all persons except those voluntarily placing themselves under certain restrictions to enter into that business. They are plainly deterring influences, and are so regarded by all except the Utopian reformers who hope to abolish intemperance entirely. The parallel as regards the subject in hand is a very close one, and the inference is obvious.

be of sufficient cogency to cause the downfall of the system, and in its stead a mongrel sort of repressive bill was passed. Under this new act the brothels of the city have been constantly raided by the police, the women taken before the justices and fined, or, in lieu of payment, sent to the workhouse for a term of weeks. It was an entire failure."—*Boston Medical Journal*, January 9, 1879.

It is taught from the pulpit that "the wages of sin is death," that disease follows transgression as a divine retribution, and that to diminish the risk of an offense against morality is to encourage vice. Does any one suppose that the gentlemen who use these arguments would be willing to follow them to their legitimate conclusion, and encourage disease in order that each transgressor should be certain of receiving his due punishment? But the whole tone of thought implied by their attitude is so foreign to a proper professional spirit, that it is only necessary to mention it to medical men to secure its condemnation.

As regards the alleged illegal interference with the liberty of the individual involved in the forced inspection of the prostitute, there seems to be no question that much more marked interference takes place in other directions without exciting unfavorable criticism, and that the argument is not based on sound legal grounds, as the right of the state to protect the health and lives of its citizens by every available means is universally conceded.

It is urged, too, that the false sense of security which may be established in the minds of young men who are cognizant of the supervision and examination of prostitutes will be a powerful encouragement to vice, while at the same time it must be admitted, by every one practically familiar with the subject, that many forms of venereal disease in females, and above all the initial lesions of syphilis, are difficult of recognition. This, however, is again an argument directed rather against a defective system. If the facts, plain and unvarnished, were once fully recognized and understood by the community—if every young man knew, as he should know, that in spite of careful examination there was still a possibility, not by any means remote, that he would contract syphilis—it may be doubted whether there would be much increase of illicit copulation. On the other hand, although all sores are not discoverable, very many are; and as the disease spreads in a geometrical ratio, the cutting off of even one source of infection would counterbalance, in its physical effects, a decided increase in numbers of those exposed to contagion.

It can not be urged with any force that the establishment of free hospitals and of gratuitous medical service for the treatment of syphilis would greatly lessen the prevalence of the disease, at any rate among prostitutes and their associates. The testimony of all hospital surgeons, to which I wish to add my own, is to the effect that the lower classes of venereal patients seek relief only when symptoms are urgent, and stop treatment at the earliest possible moment, usually when but half cured.

The points which seem to me of chief importance in regard to this subject are:

1. That in syphilis we are dealing with a bacterial disease of such demonstrable antiquity that it is evident that it has no tendency to be-

come extinct; but, on the other hand, is likely to continue indefinitely. 2. That this disease affects a large number of the population, and that by means of its many forms of inoculation and transmission it is constantly spreading still further. 3. That the existing means for its treatment among the poorer classes are insufficient, and that the establishment of institutions for that purpose, or the endowment of special wards in general hospitals, is a measure eminently worthy of the attention of the public-spirited and benevolent. 4. That its most common mode of propagation is by irregular or illicit sexual intercourse, and that therefore the main effects at prevention should be made in this direction. 5. That prostitution, arising in response to the demand for this illicit indulgence, has, like syphilis, existed from time immemorial, and is not likely to disappear. 6. That prostitutes themselves need protection, and have claims on the humanity of the law. 7. That by means of supervisory legislation and control of prostitution the unlawful sexual commerce of the world may most readily be restricted, and the spread of this disease prevented. 8. That there is sufficient evidence to prove that such control and restriction, though surrounded with difficulties, are yet possible, and that the advantages to be derived from them are definite and highly important.

The consideration of the treatment of syphilis in the individual may be divided into (1) prophylactic, (2) abortive, (3) constitutional—*a*, of early syphilis; *b*, of late syphilis; *c*, of hereditary syphilis; and (4) local.

PROPHYLACTIC TREATMENT.

Circumcision in persons with long or tight foreskins, the use of covers, the avoidance of sexual intercourse during the presence of abrasions of the genitals, the use of protective or of antiseptic ointments, preliminary ablutions with antiseptic liquids by both parties, repeated immediately after the act, are measures which would obviously tend to diminish the risk of contagion. The risks of extragenital infection are lessened by the avoidance of close or prolonged contact of other portions of the body during the sexual act; and by great care in the use, without thorough cleansing, of drinking utensils, forks, spoons, and knives, pipes or cigar-holders, or other articles of personal use after they have been employed by others.

Chastity, the self-evident means of preventing the venereal forms of syphilis, belongs, as a method of prophylaxis, to the domain of morals; and while its discouragement by the physician is inexcusable, it can scarcely be held that he should deny those who decline to observe it as a rule of life the benefit of scientific advice, which may prevent the spread of disease not only to the individual who deliberately takes the risk, but to many innocent persons. As a rule of practice, it may per-

haps be said that while such advice should rarely or never be suggested by the practitioner, it should not, on the other hand, be invariably refused. So much depends on the personal equation, as regards both physician and patient, that broad generalization is impossible.

ABORTIVE TREATMENT.

As has been stated, the essential nature of syphilis has not as yet been definitely determined. It seems probable, in the light of modern pathology, that it will be found to depend upon a specific microbe, but that microbe has not yet been isolated or cultivated, or distinctly demonstrated in any way, either clinically, experimentally, or microscopically. The treatment of syphilis can not therefore be based scientifically upon anything but clinical experience. Such experience, however, points so unequivocally to the employment of some form of mercury throughout almost the entire course of the disease, that as regards this main point there are practically no differences of opinion among living syphilographers. Whether we assume that syphilis has to be classed with the exanthemata as a specific eruptive fever, in which case the mercurial may be regarded as a specific antidote to the syphilitic virus; or believe that the phenomena of the disease are due to the entrance into the economy and the multiplication therein of a certain protoplasmic mass—the so-called syphilitic cell—in which case the effects of the drug may be attributed to its action in promoting destructive metamorphosis; or whether, confessing ignorance, we simply appeal to the history of the therapeutics of syphilis and select the drug which we know to have been of the greatest value, we are equally led to employ some form of mercury.

There are still a few physicians who believe in the *expectant* treatment of syphilis, or at least think that treatment is needful only in exceptional cases. Fournier (*Journal de Méd. et Chir. Pratique*, Dec. 10, 1891) has shown, however, that after treatment the graver cerebral and osseous lesions are never found in such proportions as where treatment has been neglected. On the other hand, one third of the cases of cerebral syphilis have been preceded by a benign second stage. The deductions from these facts are that no warrant for a favorable prognosis is afforded by even the most benign and mild secondary stage, and therefore that even the mildest forms of syphilis should always be thoroughly treated. In all probability those grave manifestations which are occasionally seen in cases where absolutely no previous history of syphilis is to be found are the results of neglect of initial symptoms which on account of their benignity have escaped notice.

Proper Period for beginning General Treatment.—When we approach the subject of the proper period at which to begin treatment we meet at once with a wide divergence of opinion. Mr. Jonathan

Hutchinson, unquestionably one of the ablest of living syphilographers, has recently reiterated the views which he long ago expressed regarding the early administration of mercury in syphilis, claiming that by the prompt employment of the drug in cases of chancre, and its subsequent continuous use, the secondary stage of the disease may be suppressed or rendered "abortive." His general propositions will undoubtedly meet with universal acceptance. When he states that in cases in which the induration of the sore is well characterized and considerable, it always yields quickly and definitely to the influence of mercury; that we never see sores remain typically hard while the patient is under that influence; that in cases in which high temperatures have been observed in syphilis they always promptly subsided under the use of mercury; and that when the patient receives no treatment until his eruption is well out, mercurial medication will usually, in the most definite manner, cause the eruption to disappear, every one having experience in the treatment of this disease must agree with him. The probable truth of the view which he has always so warmly advocated, that syphilis is due to a specific particulate virus, or, in the language of to-day, to a living microbe, and that therefore it is quite within reason to speak of the "specific" or "antidotal" action of mercury, will also be generally admitted. But when we come to consider his advocacy of the administration of mercury immediately upon the appearance of induration in the chancre, we meet with a serious practical difficulty, which, it seems to me, Mr. Hutchinson hardly estimates at its full value. There is a widespread belief among syphilographers that while there is a strong probability that an indurated sore will prove infecting, and that a soft, suppurating sore will not, there are exceptions to both these rules, and that "there is really no absolute proof of the infecting nature of any given sore, but the fact of infection itself." Mr. Hutchinson, it is true, says that ever since the recognition of the facts that some chancres are not infecting, and that the phenomenon of induration is the most valuable one by which to diagnosticate the true chancre, we have been in the habit of waiting until the character of the sore declares itself before beginning to use the specific, and adds that many, and especially those of the French school, have advocated delay until constitutional symptoms in the form of eruption appear, but with this remark apparently dismisses this aspect of the subject.

I have always regarded his work and teachings with such admiration and respect that I have been led once more to consider the matter carefully, having for years taught and practiced on the theory above mentioned, namely, that, all things considered, it was wisest to postpone the use of mercury until there was evidence of constitutional infection. Every surgeon whose work has brought him in contact with large numbers of cases of venereal sores must recognize the fact, rather unaccount-

ably ignored by Mr. Hutchinson but unquestionably familiar to him, that between the typical soft suppurating local sore and the distinctly indurated chancre there are large numbers of doubtful ulcers which partake of the characteristics of both; local sores with deceptive inflammatory hardening and true chancres with equally deceptive inflammatory softening, suppuration, and even loss of substance.

Nearly every specialist who has written upon the subject has been influenced by this well-known fact. Mauriac, in his excellent paper on the diagnosis of chancre, after describing the cartilaginous, elastic, sharply circumscribed resistance met with at the base of a true chancre, says that when we find it we may "suspect very strongly that we are dealing with a syphilitic growth, although even those symptoms can not be considered as infallible." Diday prefers to wait until secondary symptoms make their appearance before instituting mercurial medication, believing, with Zeissl and Sigmund, that the subsequent course of the case is either uninfluenced, or is actually rendered milder by this delay. Keyes says: "General treatment should be commenced as soon as the diagnosis of syphilis is positive. To be positive on such an important point requires more evidence than is furnished by the simple physical characters of the sore, be they ever so positive. Diagnosis sufficiently accurate to commence treatment upon can only be made by confrontation—establishing the syphilitic disease in the person from whom the chancre was derived—or by waiting until some positive corroborative signs of secondary lesions appear."

Fournier, perhaps the most eminent living syphilographer, has recorded a case which bears most strongly upon the question under consideration:

A female child, six years old, was said to have been infected with syphilis during an attempt at rape. She had marked vulvitis, and upon the labia three grayish, shallow, indurated ulcers covered with a diphtheritic-looking membrane, and raised a little above the general surface. In both groins there were enlarged, multiple, lymphatic glands. Fournier positively diagnosed chancre, but, conforming to his custom in medico-legal cases, declined to testify for a few days. During this time, under a simple dressing, the symptoms disappeared, and the patient, who was carefully observed for several months, never showed any subsequent signs of infection.

Fournier believes that the case demonstrates that small inflammatory lesions may so closely resemble chancres as to deceive the most experienced surgeon, and adds that in medico-legal cases the diagnosis should not be made upon the local lesions alone, but should depend upon the development of constitutional symptoms.

Fenlard (*Bull. Soc. franç. de Dermat. et Syph.*, Paris, 1892, iii, 16–22) has reported a case of syphilitic eethyma situated on the penis of a child

fifteen months of age and having all the characteristics of a hard chancre, the parents displaying undoubted specific lesions.*

It would be easy to multiply evidence to this same effect, and I could from my own case-books give many examples of cases in which, if compelled to express an opinion, based upon the appearance at a given time of the local sore, I should have made the diagnosis of syphilis, although delay has, fortunately for the patients, demonstrated the innocent character of their troubles. Mr. Hutchinson, to be sure, says with characteristic candor that he must admit that the gross total of cases of primary syphilis which has been under his care has not been so much as that which falls to the share of specialists, particularly those holding hospital appointments, and that more patients come to him in the secondary stage than in the primary. This probably accounts for his somewhat too sweeping recommendation as to the early employment of mercury.

The surgeon who is daily called upon to give an opinion in cases which involve the whole future of the individual, his relations to the other sex, his determination toward celibacy or matrimony, his matrimonial relations if he should be already married, the question of the influence of paternity, the institution of a course of treatment extending over years, the diagnosis of any obscure visceral troubles which he may develop later in life, the profoundly depressing mental effect which a knowledge of syphilitic infection usually has upon intelligent people—the surgeon, I say, who remembers these facts and recalls the views which I have above cited as to the possibility of error, should surely hesitate about beginning a course of treatment which will possibly obscure or render altogether impossible the diagnosis.

Mauriac, in claiming that the reason urged by those opposed to the early or abortive treatment—i. e., that it prevents the appearance of secondary symptoms—is rather a reason for its early use, fails to appreciate the point of their argument. That such an abortive treatment is possible in certain cases, at least so far as outward symptoms are concerned, is probable; but until the cause, specific or bacteriological, is demonstrated,

* Thierry recommends that for the diagnosis of doubtful venereal sores a scraping from the surface of the sore be gently taken with a blunt knife and placed between two cover-slips. Each of these should be rapidly dried over a spirit lamp, allowed to remain for two or three minutes in a solution of cosine, and then passed for half a minute into forty per cent caustic potash solution, washed with distilled water, dried with blotting paper, and mounted in glycerin under a magnifying power of from 300 to 400 diameters.

The discharge from a herpetic or from an infecting sore contains no elastic fibers, whereas that from a soft sore does. This examination, the author says, will often confirm and sometimes correct the diagnosis of the nature of a sore, but it must not be absolutely relied on.

He gives tabular results of his method applied in seventy-two cases (*Le Prog. Méd.*, January, 1889). I have not heard that these results have been corroborated.

and a certain method of differential diagnosis is established to distinguish the primary lesions from all other similar sores, it must still remain sound practice to delay treatment until absolute proof is present.

While I am not disposed in the least to agree with those who believe there is positive advantage in this delay as regards the subsequent course of the case, yet I do not think, on the other hand, that the gain from the immediate treatment during the primary sore is sufficient to counterbalance the doubt and uncertainty which that treatment often throws about the future life of the patient. It has been my custom to advise my pupils never to begin constitutional treatment for syphilis unless they were prepared to demonstrate that the disease existed; and certainly the cases are frequent in which a careful surgeon would be unwilling to take this position during the existence of the primary sore alone. There are a few necessary exceptions to this rule, which may be included under the following heads:

1. Where confrontation is possible, and the sore is distinctly a typical one.
2. Where, with a similar sore, its continued existence would destroy or imperil the conjugal relations of two people or possibly the happiness of an entire family.
3. Sores with characteristic induration, but with marked tendency to spread and involve important regions.
4. Sores in such conspicuous positions, as upon the lips or the nose, that their continuance would involve a general knowledge of the patient's condition.
5. Sores in such positions, as on the finger of a surgeon or an obstetrician, as may lead to the infection of others.
6. In cases of infection of women during pregnancy.

With these exceptions I still believe, in spite of Mr. Hutchinson's teachings to the contrary, that it is the part of wisdom to wait until the development of glandular enlargement at some point removed from the initial lesion, and not, therefore, by any possibility a result of simple adenitis, demonstrates the constitutional character of the trouble. It is not necessary to wait for the syphilodermata. Treatment may be safely begun when, after a suspicious sore upon the genitals, consecutive enlargement of the epitrochlear or post-cervical lymphatics takes place, and, beginning at this stage, I can cordially indorse all that Mr. Hutchinson claims for a continuous mercurial treatment as to its effects in suppressing or "aborting" subsequent symptoms.

This opinion in regard to the period at which we should begin treatment is supported by Fournier, Neumann, Kaposi, Neisser, Unna, Köbner, Zeissl, Diday, Sigmund, and many others; while, in addition to Hutchinson, Mauriac, Jullien, Schwimmer, and Watrazewsky are among the foremost of those believing in the early or abortive treatment.

Local Abortive Treatment.—The arguments which I have used as against the mercurial treatment of chancre apply with equal force to

the local abortive measures which have from time to time been recommended. These include cauterization, excision, antiseptic measures, and various local applications of mercurial preparations by means of ointments, hypodermatic injections, or otherwise. Taking them in the order mentioned, their relative advantages and disadvantages seem to me to be as follows:

As to *cauterization*, it appears to me unquestionable that it can be of service in but a very small proportion of venereal sores as they usually come under the notice of the practitioner. The publication of certain cases—such as the well-known one of Mr. Hill, who cauterized the torn frænum within twelve hours after the accident, and in whose patient syphilis developed at the usual time; and that of Clere, in proof of the uselessness of immediate ablution—has had a marked effect in influencing professional opinion upon this matter. The teachings of Ricord and Sigmund, who believed that cauterization within five days after contagion certainly prevented infection, have long since been shown to be misleading, as in those days local sores were not clearly differentiated from infecting chancres.

Sores which appear within five days after intercourse are rarely or never syphilitic, and this fact at once throws out ninety per cent of Ricord's and Sigmund's alleged successful cases. In the remainder, in which cauterization was immediately applied, as in Mr. Hill's case, to a tear or abrasion during coitus with a person known to be syphilitic, there is, of course, no certainty that the disease would have developed even if local treatment had been adopted. The opinions of syphilographers vary greatly in regard to the value of this form of treatment. Keyes peremptorily rejects it as useless and unphilosophical, with the remark that no amount of cauterization nor any local treatment can prevent the development of general syphilis after the poison has once been absorbed, much less after the chancre has appeared. Hill and Cooper think it wiser to assume that we can not indicate any period at which syphilis is a local disease which can be extirpated by local treatment. Bumstead and Taylor believe that chancre is never a mere local lesion. On the other hand, Mr. Hutchinson finds it difficult to believe that absorption of syphilitic virus is so rapid that there is no stage during which it remains limited to the seat of inoculation, and prefers to act as if this stage comprises the first week or ten days after contagion.

Excision of the Chancre.—Jullien remarks that, in spite of theoretical considerations as to the rapidity of absorption of the virus of syphilis, or of other contagious diseases, he still thinks we have no right to neglect whatever small chance may be offered by the employment of cauterization or excision whenever the sore is seen during the first three days. Within the past ten years he has excised eighteen chancres. In

only fifteen cases, however, were the patients under observation for a sufficient length of time. Of these, three remained free from syphilis, the other twelve having a mild form of the disease. In two cases there were multiple chancres following the excision, which fact, Jullien believes, shows the efficacy of the excision by the absence of a protective infection of the system. One patient who remained free from symptoms for seventeen months, contracted another sore at that time; there was no excision of this second sore, and syphilis followed.

Cornil says that we are not in possession of absolutely conclusive evidence upon this point, but that it is highly probable that the syphilitic virus inserted under the skin remains there a certain length of time without any other action than gradually to change the cells which are in immediate relation with it, and slowly to prepare them for the hyperplasia which soon constitutes the chancre. Auspitz, Unna, and Kölliker believe that the initial indurated sore is not to be considered as a symptom of general infection. The experience of the latter authors in the excision of chancres has encouraged them to believe that, in a small proportion of cases, general contagion may in this way be prevented.

Ehlers (Tenth Internat. Med. Congress, Berlin, 1890) believes that excision lessens the severity of subsequent symptoms, their intensity being proportional to the amount of infection. He gives the following statistics, based on five hundred and eighty-four reported cases and thirty-seven observations: In cases where excision was used there were ten per cent of abortive cases, eighty per cent much modified, and in only ten per cent did severe symptoms appear. From this he concludes that excision is useful both in preventing general infection and in modifying the course of the disease. He advises incureurial treatment in conjunction, whether secondary symptoms appear or not. He also cites two cases in which a second inoculation followed excision.

It is to be noted that in the discussion following Ehlers's paper all the speakers, with the exception of Neumann, believed in the theoretical possibility of either aborting syphilis or rendering its course milder by excision of the chancre.

Fournier believes that excision gives an average of one success in five cases, and that it should be employed—1. When by confrontation the syphilitic origin of the lesion can be demonstrated. 2. When the period of primary incubation has been from twenty-four to twenty-eight days. 3. When the evidence renders it impossible to confound the sore with herpes, soft chancre, folliculitis, or ulcerating or chancreiform syphilides. To make the case of any scientific value, the patient should remain under surveillance for a prolonged period of time, without mercury or the iodides.

Among those opposed to excision there exists a considerable amount

of doubt, in regard to the trustworthiness of the reports of the cases operated upon. Renault voices this doubt when he says that he believes that "not a single report of excision is valuable as far as the *proof* of its usefulness is concerned"—basing this opinion on the inability of the observers to diagnose the initial sore from many others; he believes the uncertainty is worse for the patient than the disease.

Familiar with these opposing views, and striving to find a safe general rule for practice and teaching, I have for a long time thought it best to assume that a sore seen within a few days after its appearance, and as yet unaccompanied by any enlargement of the inguinal glands, was still a localized lesion. If favorably situated—i. e., upon the skin of the prepuce or of the genitals—I have advised its removal by excision, and in a large number of cases have practiced it, picking up the sore and surrounding tissue with a pair of toothed forceps, and removing it by a single sweep of the knife, or by means of scissors curved on the flat, afterward dressing the wound with iodoform or boracic powder. When the patient refused this treatment, or when the sore was so situated that its removal would cause considerable pain, hæmorrhage, or deformity, I have employed destructive cauterization with fuming nitric acid.

As regards protection from subsequent constitutional disease, my results have, on the whole, been unsatisfactory; but in a few cases—seven, all told—I have succeeded in making my observations under unusually favorable circumstances. In these cases the patients came to me promptly upon the development of the sore, and sent to me, for examination, the woman with whom they had had connection; evidence of syphilis being discovered in the latter, I excised the sores of the male patients, and cauterized the resulting wound with nitric acid. In three of these cases, microscopical examination by my friend Dr. Simes showed that the sores possessed the usual characteristics of hard chaneres. In one of them slight glandular involvement had already shown itself; in the others it had not yet appeared. The shortest period intervening between the appearance of the sore and my inspection of it was twenty-four hours, the longest five days. In three of the seven cases, including the one in which there was slight glandular involvement, no further symptoms have ever developed; in the remaining four the appearance of constitutional symptoms was delayed from three to five weeks beyond the usual time, just as is the case from the mercurial treatment of chanere.

It is only fair to add that, during the time I have been making these observations, I have had several cases in which excision was not performed, on account of the anatomical seat of the sore, which I yet believed to be almost certainly specific, but which healed, and disappeared without the development of the slightest constitutional trouble. In these latter cases, however, I had no opportunity for confirming my diagnosis

by confrontation. In all cases (and these comprise the majority which come for treatment) in which a week or more has elapsed since the development of the sore, and in which involvement of the dorsal lymphatics of the penis and the inguinal lymphatic glands is observable, I reject cauterization as a routine method of treatment, on account of its undoubted uselessness at that stage in preventing constitutional disease; the pain which it causes; the inflammatory action which follows it, and which often produces enough œdema and swelling to cause phimosis and thus convert an open sore into a hidden one; the subsequent effusion of lymph, which simulates true induration and confuses the diagnosis; and, finally, the greater liability to the production of suppurative action in the ordinarily indolent bubo of syphilis.

It seems to me that by following these rules I have given my patients whatever small chance there may be of avoiding constitutional disease, while at the same time exposing them to the minimum degree of local pain and disturbance.

The so-called *antiseptic treatment* of the initial lesion of syphilis seems to me a misnomer, so far as the essential character of the sore is concerned, unless it be meant to include only the thoroughly destructive cauterization of all portions of the infected tissue. Applied simply to superficial dressings placed over the chancre, it can refer only to the prevention of the development of pyogenic organisms upon the surface of the sore. As the tendency of infecting chancres to suppuration is usually very slight, and their local significance is generally unimportant, we can hardly look here for advantages from the employment of aseptic or antiseptic methods which are at all commensurate with those obtained by the same measures in ordinary surgical conditions.

The method recently recommended by Bronson, the local treatment by *hypodermatic injection of mercurials* beneath the base of the initial lesion and into the mass of the indurated lymphatic glands, is based almost exclusively on theoretical grounds. It appears to rest upon the view that mercury acts as an antidote when brought directly into contact with the syphilitic germs, and that this influence would probably be especially active if the drug were brought to bear directly upon the local lesions which are the foci of infection during primary syphilis. If we believe that the virus remains localized for a time after inoculation and is not disseminated through the general system, and that mercury acts by its germicidal influence, this treatment is not unphilosophical, but seems manifestly inferior to the more thorough plan of excising both the chancre and the enlarged lymphatics of the groin. The latter procedure would perhaps be less likely to result in local troubles, such as abscess or cellulitis, and would certainly be more effective.

Neisser (Deutsche med. Woch., Jan. 3 and 10, 1884), after observing

that failures after excision were so numerous that it was practically abandoned, says: "It is only recently that the old-time theory and practice have been reverted to, as in full accordance with the bacterial notion of syphilis, and now we direct our efforts to the extirpation of the primary sore, in the hope of thus preventing, at a single stroke, the extension of the mischief. That is, we regard the initial induration as simply the local focus of infection, as the center in which the syphilitic virus is developed and from which it spreads, and consequently as the chief if not the only source of general contamination." He suggests that, reasoning from theory if not from practice, the progress of the disease may be rendered milder by excision of the sore, in cases where it is not prevented. For similar reasons he is strongly in favor of extirpating the lymphatic glands first involved.

If Finger's assertion be correct, and if the innocuity in the primary stage be due to tissue products of the virus in the circulation, the infected foci being still strictly localized; and if, further, the severity of the syphilis has any relation, as he claims, to the dosage of the virus (see p. 709), excision of the primary lesion becomes not only a warrantable but a logical and proper proceeding. Some years ago, basing my opinions simply on clinical experience, I said (Cornil on Syphilis, American edition, p. 106) that the evidence in favor of excision was sufficiently conclusive to warrant its adoption in most instances. In the new light which bacteriology is throwing upon this disease in all its stages, there would seem to be more reason than ever before to adopt excision as a routine practice whenever the situation of the sore admits of it.

My views upon the general subject of the abortive treatment of syphilis may be expressed as follows:

I. While it is unquestionably desirable to begin mercurial treatment at the earliest proper moment, while that treatment undoubtedly either suppresses or renders milder the subsequent secondary manifestations, and while there is every reason to believe that in this way the liability to later or tertiary lesions is somewhat lessened, nevertheless the sum total of these advantages does not warrant the employment of mercury one moment before the diagnosis of constitutional disease is absolutely assured.

II. While in many cases that diagnosis can be made with a high degree of probability from the appearance of the primary sore alone, yet it can not be said that all possibility of error is excluded until some general symptom, such as the enlargement of distant lymphatic glands, has shown itself.

III. The administration of mercury during the existence of the primary sore, unaccompanied by general symptoms, for the purpose of suppressing or "aborting" syphilis, is not therefore justifiable, unless by

confrontation the diagnosis can be confirmed, or unless there are urgent and unquestionable reasons for securing rapid cicatrization of the chancre.

IV. It is proper to employ cauterization or excision according to the site of the chancre, in cases in which it is seen very soon after its appearance, and especially when it is known to have followed intercourse with a syphilitic person. The chances of preventing constitutional infection in this way, while slight, may yet be considered sufficient in such cases to counterbalance the disadvantages of the method, such as pain, swelling, the production of phimosis or of suppurating bubo, and the obscuring of the diagnosis by the resulting inflammatory exudation.

V. Aseptic or antiseptic measures, while harmless, can not be considered especially indicated in the local treatment of chancre, and can in all probability have no true abortive influence.

VI. The local use of mercurials, hypodermatically or by inunctions, is perhaps worth a trial, but it is probably inferior to the more radical methods based essentially upon the same principles, namely, excision and cauterization.

CONSTITUTIONAL TREATMENT.

History.—For nearly four centuries mercury has, for one or another of the reasons already stated (p. 715), been the drug chiefly employed in the treatment of syphilis. Of these theories that which seems the best supported by modern research is the one that attributes its good effects to an antidotal or bactericidal action. Corroborative evidence is afforded by the experiment of Boeck, who says that if we add to a drop of virulently infectious syphilitic pus one drop of a 1 to 1,000 sublimate solution, this mixture injected beneath the skin is devoid of all infectious quality. During the period immediately following its introduction by Cumanus (1495) its use by means of inunction, fumigation, and baths was attended with consequences often worse than the disease itself, the large doses thus given leading to salivation, profound cachexia, serious paralysis, etc. Cornil (American edition, translated by Simes and White, p. 432) has well summarized the subsequent history of its employment in syphilis: The toxic effects arising from the abuse of mercury were so grave that the introduction of guaiacum and of the sudorifics, which were advanced as sovereign remedies in the cure of syphilis, was hailed as a deliverance. From this time the physicians divided themselves into mercurialists (Vigo, Fracastor, Massa, Botal, and Rondelet) and antimercurealists (Torrella, Fernel, Fallope, etc.). Shortly afterward mercury was used internally, at times in the form of the red oxide, at others as the deutoxide, or in pills of metallic mercury—the latter form, according to accounts of the times, being taken by Francis I. The employment of mercury was still, however, nearly always pushed to the production of salivation.

Nevertheless, at the commencement of the eighteenth century, Chicoyneau, and the school of Montpellier, substituted for salivation—now considered useless—more moderate doses with a prolonged course of medication, and called it the “method of elimination.” In our time, Broussais and his followers, Deruelles, Devergie the elder, and others, considering syphilis as a collection of nonspecific inflammatory lesions, treated it by bleeding and by attention to the diet.

Fergusson, Thompson, and others, in England, also treated their patients without mercury, and it is necessary to count among the anti-mercurialists the partisans of syphilization, Auzias-Turenne and Sperino, who, seeking a sort of vaccination for syphilis, believed they could cure it, and place a patient beyond the reach of its poison by inoculating him with the pus from a simple chancre. The recognition of the dualism of chancre and syphilis has terminated these attempts.

Murphy (1839), in England, Joseph Hermann (1855), and Lorimer, in Vienna, endeavored to show that mercury was the sole cause of the secondary and tertiary phenomena of syphilis. Kletzinsky having proved that the use of iodide of potassium tended to eliminate mercury from the system, Melsens argued from this that iodide of potassium acts in the third stage of syphilis merely because it drives out the mercury, the cause of all the evil. Kussmaul (1866) and Virchow, by a long study of the histological effects on the one hand of mercurialism, and on the other of constitutional syphilis, had no difficulty in proving that there is no analogy between these phenomena.

At the present time the number of anti-mercurialists is very small, M. Despres having been recently the only representative of this doctrine in France. He regarded, and with some reason, the tertiary productions, especially the gummata, as traces of chronic inflammations, similar to those resulting from purulent infection, and denied that they possess any specific quality. According to him, syphilis should not be obstructed in its onward course any more than an eruptive fever should, and he confined his treatment to the giving of tonics to sustain the strength of his patients.

Hutchinson (*The Modern Treatment of Syphilis*, *The Practitioner*, June, 1891, p. 403) says: “Excepting in Edinburgh, I believe there are at present in the profession scarcely any anti-mercurialists left, and I may remark, in passing, that during the last few years some of the most severe cases of syphilis that I have seen have come from Edinburgh, and have been treated in the early stages by systematic abstinence from mercury.”

Taylor says (*Hare's System of Therapeutics*, vol. iii, p. 38), “I know of no anti-mercurialists in America.” I believe that as regards syphilographers this is true. There are, however, a great many practical anti-

mercurialists among the general practitioners, who, yielding to the prejudices of patients or timid in the use of the drug, give it in quantities so small and for periods so short that for all useful purposes it might as well not be given at all.

Although the ultra-antimercurialists have nearly disappeared, many of the syphilographers (Diday, Lancereaux, Jullien) do not give mercury in every case, and can thus be classed with the moderate mercurialists in comparison with Fournier, who invariably employs this drug, and continues its use after all phenomena have disappeared.

To the latter class belong also Hutchinson and the leading syphilographers of Great Britain, Germany, and America.

Diday, to be sure, believes syphilis to be a self-limited disease, and thinks that with proper regard to hygiene and nutrition patients recover as quickly as when under specific treatment, and are no more liable to relapses. It may, however, be considered as a well-established fact that, without detriment to health, the chances of a successful cure can be increased and its approach hastened by the careful use of some form of mercury. According to Fournier (see p. 715), grave cerebral and osseous lesions are not so frequently found in cases treated by mercurials as when hygienic treatment alone is employed. There is, for example, no warrant for giving a favorable prognosis after a benign and mild secondary stage, as one third of the cases of cerebral syphilis have been preceded by such a mild form, and even mild cases should therefore receive thorough treatment.

But when we have decided for the above reasons to administer mercury as a routine practice to all or nearly all our syphilitic patients, and have concluded (p. 724) that it is wise in the majority of cases not to begin its exhibition until the development of an unmistakable constitutional symptom, there will still remain some important questions to determine :

1. Shall it be given only as symptoms demand it?
2. Shall it be given continuously over long periods?
3. Shall it be given interruptedly in periods of varying length with intervals of complete rest from medication?

These are the main questions that are under discussion. Each of these plans has its advocates, and each of the latter two has its merits. They may be considered in the order of mention.

1. **The Modified "Expectant" Plan of Treatment.**—This is supported more or less fully by Diday, Lancereaux in France, and by the two Zeissls in Germany, but has in my judgment little or nothing to commend it. That in a disease almost certainly due to microbial infection, with the knowledge that the tissue changes produced in it are widespread and often permanent, and that there is good ground for believing that in this, as in all such diseases, the gravity and extent of these changes

depend largely on the relation between the "dose" of the micro-organism and the resisting power of the normal cells, we should avoid the use of a drug whose antidotal or germicidal power has been so abundantly proved, except when gross superficial lesions obtrude themselves upon our notice, is to my mind most unphilosophical. Nothing whatever that has been written in support of this plan—and much eloquence has been expended upon the subject—is worthy of serious consideration in the face of such observations as those of Fournier already quoted (pp. 715, 727), and the accumulated clinical experience of the profession. As Taylor says (*op. cit.*, p. 41): "If any one wishes to get a good idea of the expectant or opportunistic system of treating syphilis, let him study the disease in dispensaries, clinics, and hospitals. Patients who are treated in these institutions, as a rule, do not apply until more or less urgent manifestations and symptoms begin to trouble them. In general, they merely get patched up, for they only remain as long as their immediate trouble is present and urgent. Then off they go, to return later on with new and perhaps worse manifestations, no medicine having been taken in the meantime. Then, again, let any man who sees in his practice many cases of syphilis watch those who follow treatment regularly and carefully, and compare their condition with that of patients who are careless and only apply for relief in times of urgency, and he will find that the *laissez-aller* cases are the ones which, as a rule, do badly."

2. The Continuous Treatment of Syphilis.—As a routine method this varies in its details according to the drug employed and to the method of ingestion.

It may be considered here as described by two of its principal advocates, and in their own words:

(a) Mr. Hutchinson, who, as long ago as 1874, emphasized the importance of thorough and long-continued courses of mercurials in his most recent publication (*Syphilis—Clinical Manual*, 1890, p. 51), says:

One simple rule appears to be the key to success. It is, to give small doses more or less frequently repeated, and never large ones. . . .

Hydrargyrum cum creta is perhaps the most constant and least variable of all preparations. It may be made into pills of one grain, in combination with one grain of Dover's powder if necessary, and of these the patient may take one every six, four, three, or even two hours, according to circumstances. Usually, one pill four times a day will suffice to clear away a chancre or a secondary eruption as rapidly and as completely as can be wished. In some cases it may be more convenient to double the dose than to increase the frequency of administration; but the latter, if the patient is willing, is the better plan. If pyralism should occur with such doses, it will certainly be mild and easily controlled. As a rule, however, all the symptoms of syphilis may be got rid of without any affection of the gums. If such affection should occur, it usually implies the full physiological influence of the drug, and a very rapid subsidence of symptoms may be simultaneously expected.

(b) Keyes, who has formulated a working rule which has been widely followed in this country, says :

The same drug should be used continuously if possible. It may be changed occasionally for a time to meet an emergency—i. e., when, in spite of the tonic dose, as is often the case, there suddenly occurs an outcrop of fresh symptoms. Now, instead of using the “full dose,” some other more active means may be employed, as bichloride internally or by injection, fumigation, inunction, etc., until the new symptom yields, after which it is well again to revert to the original drug and fall back upon the “tonic dose.” . . .

The standard fractional dose being selected, preferably in form of granules—one sixth grain of protiodide, one half grain blue mass, one thirtieth grain bichloride—it remains to find the “full dose” and the “tonic dose.” No combination containing opium can be used in selecting a standard fractional dose. The diet and habit should be regulated, and the course commenced by causing the patient to take one granule of the standard preparation immediately after each meal for three days—that is, three a day. For the next three days he takes four a day (one in the morning, two at noon, and one at night); then, for three days, five a day (two in the morning, one at noon, and two at night); then, for three days, six a day (two in the morning, two at noon, and two at night); then, for three days, seven a day (two in the morning, three at noon, and two at night); then eight, and so on, adding one granule to the daily dose each fourth day—if there is reason for haste I make it each third day—until pernicious medicinal effects of mercury begin to show themselves, which are, with the protiodide, usually griping pains in the abdomen, and at least two free watery stools a day. An occasional pain I pay no attention to, and free movements of the bowels I do not regard so long as these movements are not watery. Mild colicky diarrhoea is what I wait for, and when this comes I write down the daily number of pills required to produce it, and name this number the “full dose.” Such a dose may and usually does promptly control syphilitic symptoms, and it may be maintained, and its obvious objectionable features done away, with by giving the patient a certain number of half-grain granules of opium to take along with his protiodide. If blue pill, gray powder, or bichloride be used, the full dose may first announce itself by commencing irritation at the mouth before the intestines show disturbance. This full dose can not be maintained without injuring the patient, and it must only be used for a short time when required for emergencies.

Half the full dose is the “tonic dose,” and sometimes one third the full dose is all the patient requires to keep him moderately free from symptoms, which is all he can ask.

If, when the patient is first seen, his symptoms are so severe that he can not wait to find his dosage by this method, he may be more actively treated by bichloride, by fumigation, or inunction, until his active symptoms are over, and then, after a rest, his full dose may be sought in the manner above described and his tonic dose obtained.

Few patients can take more than twelve granules a day for their full dose, and more stop at nine. I have known a patient go to twenty. If a patient can not take three a day I consider him unfit for treatment, by the protiodide. The size of the “full dose” varies greatly for different individuals.

The patient is not to be kept at his full dose. If he has active symptoms he

may be kept at three quarters of the full dose, or the latter may be maintained by opium until the emergency is over. If the symptoms are not active, a rest should be given for several days until the ill effects of the mercury have entirely subsided, and then the "tonic dose" may be commenced with the idea of continuing it daily, month after month, for an average of about two and a half years. Under this dose—one half or one third of the "full dose"—the patient will often, but of course not always, enjoy better health than he did before he got his chancre—that is, he will eat, drink, sleep, and work with greater satisfaction to himself. True, he will have occasional drawbacks in the form of mouth-spots and of out-cropping syphilitic symptoms, and these must be met by appropriate local means, or by temporarily putting in a portion or even the whole of the "reserve dose" to constitute the "full dose," protected by opium until the flurry is over.

I have given these views in the exact language of the authors, and very fully, both because they represent the essentials of the continuous system of treatment and because they form the basis of the method which I prefer and shall presently describe.

3. The Interrupted Treatment of Syphilis.—(a) This method has for its most distinguished advocate Fournier, whose views have, however, undergone considerable modification since they were first announced in 1872. He then limited the period of treatment to two years. He began by the administration of from three quarters of a grain to one and a half grain of the protiodide daily in divided doses (Taylor, *op. cit.*, Annual Univ. Med. Sci., 1891, F. 34). He kept this up for two months, and then, no matter whether symptoms were present or not, he suspended treatment, on the theory that his patient had by that time become accustomed to the mercury and that continued doses would have only a relatively small effect. He then, in any event—i. e., either in the presence or absence of symptoms—began treatment again and continued it for from six weeks to two months. An interval of three months without treatment followed, to be succeeded by a mercurial course of from six to eight weeks, and that again by another interval, so that at the expiration of two years the ratio of the period of treatment to the period of intermission was about as 10 to 14. As Taylor says (*op. cit.*, p. 48): "It evidently has not fulfilled the expectation of its originator. for we find that within a few years Fournier writes, 'Syphilis is an infectious chronic constitutional disease, diathetic like gout and serofula, and should have a life-long treatment.' So in 1889 he says that in the third year there should be four courses of six weeks each, with respites of equal length, and that iodide of potassium should be taken; in the fourth year four similar courses of six weeks' duration, and in the fifth year three courses."

It seems possible that the most convincing argument as to the inefficacy of Fournier's original plan is to be found in this very change of method, as the lengthening of the period of treatment to make it run

through life is apparently evidence that the intermittent course has frequently failed to produce permanent cures.

(b) Taylor vigorously advocates a course of treatment consisting of the administration of about one third of a grain of the protiodide of mercury three times daily, the aim being to keep up a continuous mercurial action during from four to six months after the onset of the secondary stage. He adds:

In general, this can be done without any serious drawbacks if the case be properly watched. There may be periods of a few days in which it is necessary to suspend medicine and either leave the stomach at rest or give tonics. But, as a rule, this early period offers us our golden opportunity, and we should always avail ourselves of the then existing favorable condition of the stomach and the system to assimilate mercury. In somewhat rare cases mercury taken by the stomach acts as a general depressant and the patient's nutrition is impaired. I have many times seen these grave drawbacks and seeming contradictions promptly dispelled by the employment of hypodermic injections of the bichloride of mercury. In such cases it is well to begin with a moderate dose and then work upward as fast as we can.

During this initial, active, and energetic course we must take special care of the patient's nutrition, and be watchful of his well-being. If possible, change of air and scene at the seaside or the mountains should be enjoyed, and as much recreation indulged in as possible. The lighter the patient's cares and the less burdensome his condition of life the more auspicious will his progress toward cure be.

While a patient is undergoing this mercurial course he should have one or two warm baths each week on going to bed, in order to produce diaphoresis. When practicable he should take Turkish baths without the cold plunge, and after them should be made to sweat freely. At the seaside cold salt-water baths are very beneficial, and an occasional hot sea-water bath, followed by packing and a sweat, is a valuable adjuvant to mercurial treatment.

Having administered an efficient treatment, with few and short interruptions for about six months, it is safe to say that in most cases, particularly uncomplicated ones, the patient will be well on his way to recovery.

If the condition of the patient is satisfactory, as shown by the absence of all lesions, by almost entire subsidence of the lymphatic ganglia, by a good condition of his nutrition and strength, and by the absence of symptoms pointing to nervous depression and debility, at the end of six months he may have a rest, the moral effect of which will be very salutary.

Taylor then advises a month's cessation of medication, after which he either begins a systematic course of inunction, or puts the patient upon a combination of a full dose of mercury and a small dose of the iodide of potassium, which he keeps up, "with or without slight interruption, for three or four months, or even longer, if the patient shows no signs of deterioration of health referable to the treatment." During the first year the patient is under treatment for nine or ten months, during the second year for about eight months. He adds: In most cases, at the end of the second year of thorough treatment patients may be pronounced cured, provided they have not for many months shown evidence of the disease, that their lymphatic system appears healthy, and their general health and nutrition are good.

It may be well to mention the arguments used in favor of this latter plan of treatment—the intermittent plan.

Fournier, in 1872, gave as his reason for advocating the intermittent plan of treatment the so-called “tolerance” to mercury which was established after its continuous administration for long periods; and Taylor reiterates this, and exemplifies it in expressing his objections to the continuous plan of treatment. He says: “The continuous use of mercury by stomach ingestion induces a condition of tolerance, and after a time it ceases to be a therapeutic agent, or has no effect—certainly none that is beneficial”; and further asserts that the reason some patients who have been treated “continuously and without any intermission whatever” for two or more years still have lesions that refuse to disappear, is because “they have used mercury in a weak and impotent manner in the early days of syphilis, and have continued its use long after it had ceased to have any therapeutic effect—long after it had lost its influence, when given by stomach ingestion, over the syphilitic diathesis.”

This seems to me like a pure assumption. It may be true, but it would be more to the point to say that, whatever quantity they may have been taking by the mouth, they were probably not absorbing a sufficient dose, rather than to assert that the drug had lost its influence over the syphilitic diathesis. The probability is that mercury does good in syphilis by its action upon the specific microbe of the disease, and it is opposed to all bacteriological reasoning, if we may argue from analogy, to suppose that any “tolerance” between the micro-organism and the drug could by any possibility be established. Taylor objects also to the exclusive use of any particular drug; but this does not bear upon the discussion as to the comparative merits of a continuous and an intermittent plan of treatment, nor does his further objection to the “arithmetical” element in the plan proposed by Keyes.

Systematic Treatment.—I have now had an experience in the treatment of syphilis which justifies a certain amount of confidence in my own opinion, having had for many years teaching and hospital positions bringing with them a large service in venereal diseases, and having, as a result, seen much of such disease in my private work. I mention these facts as an excuse for apparent dogmatism in the following statements.

I believe that the best plan of treatment is as follows: While waiting for the diagnosis of syphilis to be assured in a patient who has a suspicious sore, he should be sent to a competent dentist and should have his mouth and teeth put in the best possible condition. At the same time attention should be paid to his gastro-intestinal tract, his diet regulated, and any tendency to dyspepsia, to catarrhal diarrhoea, or to constipation noted and prescribed for. At the same time, also, the urine should be examined and

the average daily quantity noted. These observations are not only of value in the future management of the case, but they serve to tide over that somewhat trying period when both the surgeon and the patient are in doubt as to the outcome. The latter feels that something is being done, that time is not being wasted, and has the not unwarranted satisfaction of thinking that he is being put in better condition to withstand the attacks of disease. As Neisser says, this period of delay is unpleasant on account of the suspense and apprehension which are unavoidable, but we must endure it and encourage our patients to do so until the time when the demonstration of the specific bacteria in the secretion of the chancre shall enable us to recognize the disease at once, and without waiting for the development of its characteristic symptoms. If, on the occasion of the first visit, a positive diagnosis can be made, it is still proper to examine the mouth, to send the patient to a dentist if necessary, and to regulate the diet.

Reasons have already been given for the selection of mercury as the drug with which to begin treatment. As to the particular preparation to be employed there is no necessity for laying down an inflexible rule. I have always thought that the protiodide was to be preferred for routine use, for the practical reason that it has stood very well the test of employment by hundreds of syphilographers in tens of thousands of cases, and has, on the whole, given good results. I have also felt that there might be some advantage in even the small amount of iodine which the salt contains. Syphilis is, from first to last, characterized by cell hyperplasia, and the indications are not only to destroy the micro-organism and favor fatty degeneration in the exudates caused by its presence, but also to stimulate the absorbents to remove the products of disintegration and retrograde metamorphosis. That the iodine of the protiodide does this to any appreciable extent there is no evidence with which I am familiar, but it is possible that it accounts for some of the good effects produced by this preparation.

The other mercurial salts which seem most worthy of mention as possibly to be preferred are the bichloride, and, on the great authority of Mr. Hutchinson, the "gray powder" (hydrargyrum eum ereta). I have tried each of these faithfully, and in many cases. Either of them if given in sufficient doses will produce the speedy disappearance of specific symptoms; sometimes one or the other can be taken freely and pleasantly when the protiodide disagrees, and this is especially true of the mercury with chalk. Blue pill, which Hutchinson makes his second choice, and calomel, which is preferred by others, have in my experience been so unsatisfactory that I do not include them in the list of preparations from which the one for the routine treatment of syphilis is to be chosen.

I agree, however, with Mr. Hutchinson in the belief that simplicity

of prescription is an advantage not to be despised in the busy life of a surgeon, and that there is a great deal of wear and tear to be saved by habitually prescribing the same remedy for the same disease. A still stronger argument leads me to recommend the selection of one or the other of the above drugs to the exclusion of all the rest in an average case; and that is, that a safe basis for comparison is soon established in the mind of the surgeon, and he is better able to estimate the obstinacy or inveteracy of a particular case, and thus can give a more accurate and useful prognosis, if he has observed the reaction of the patient and of his symptoms to a given drug in a large number of instances, than if he has employed a variety of preparations. This does not interfere with the treatment of the individual, with the withdrawal of any particular remedy in the presence of symptoms of disagreement, nor with the substitution of any other remedy that may seem indicated.

Indeed, it is probable that every syphilographer of experience, whatever may be his theoretical views on the subject, sooner or later settles down to the use of the tool with the workings of which he finds himself most familiar and best satisfied.

If the protiodide be selected, the patient may be given the following prescription :

℞ Hydrarg. iodid. viridis. ℥j
 Confection. ros. q. s.
 M. et ft. pil. no. lx.

He should be told to take three pills on the first day, four on the second, five on the third, and so on, increasing the dose by one pill each day, and reporting for observation every second day. As the surgeon is endeavoring at this time to ascertain definitely the patient's susceptibility to the drug—i. e., to learn just what quantity of it will begin to produce its characteristic toxic effects—it is evident that some standard must be adopted, some characteristic symptoms sought for.

These symptoms should be really and unmistakably indicative of the full physiological or beginning poisonous effects of mercury. They should not therefore include those which may reveal only its local irritant properties, and may vary greatly with temporary conditions, as, for example, those of a mucous tract like that of the gastro-intestinal system, unavoidably subject to many disturbing influences. For that reason I believe the rule which makes a certain amount of intestinal colic or looseness of the bowels—"mild colicky diarrhœa" (see p. 729)—the gauge of the patient's susceptibility to mercury to be an unsafe guide in practice. Colic and diarrhœa show only the reaction of the mucous membrane of the stomach and intestines to the particular preparation of mercury which is being used. They may occur under a dose which is altogether inadequate to

deal with the microbe or virus of the disease. They indicate defective absorption of the drug, and leave it open to question whether, when they have made their appearance, one half, one third, or some other fraction of the daily dose is being taken up and reaching the general circulation.

I think there can be no doubt that the object aimed at—i. e., the discovery of the susceptibility of the individual to mercurials—is an important and useful one. The therapeutics which eliminates personal peculiarities, idiosyncrasies, the varying reactions of normal tissues to the agents employed by the physician, is that of the days of Galen or Paracelsus. Acquaintance with the characteristics of different families and different members of the same family constitutes the great merit of the general practitioner, and often makes his advice of more value than that of the most distinguished specialist. In a disease in which treatment is to be conducted chiefly by means of one drug, and is to extend over years, it is so obviously sensible and philosophical to learn at the outset the patient's reaction to that drug, that it seems to me useless to argue at any length in defense of the principle.

But in applying it, if a faulty standard is adopted, the rule may lead to lamentably insufficient treatment and disastrous consequences.

I prefer, therefore, to regard the condition of the mouth and gums as the only safe guide to the information which is sought, and to be influenced by the intestinal symptoms only to the extent of seeking some more digestible mercurial preparation. If, during the early days of treatment, and before the premonitory symptoms of ptyalism appear, there is considerable amount of colic and diarrhœa, I usually withdraw the protiodide and give the patient the following recipe:

℞ Hydrarg. cum creta 3 j
Ft. pil. no. lx.

I instruct him to take these in the same way, increasing the dose each day, but I expect to get a somewhat more marked effect from one-grain pills of gray powder than from an equal number of one-third-grain pills of the protiodide. If this second attempt fails and gastrointestinal irritation precedes ptyalism, I usually try the bichloride:

℞ Hydrarg. chlorid. corrosiv. grs. iv
Confection. ros. q. s.
M. et ft. pil. no. lx.

Or:

℞ Hydrarg. chlorid. corrosiv. grs. ij
Mucilag. acaciæ,
Aquæ āā f ʒ ij
M. et S. Teaspoonful freely diluted as directed.

If this fails, I proceed to the employment of inunctions in the manner to be hereafter described (see p. 754).

In cases where the circumstances of the patient, such as constant traveling, or the necessity for concealment, absolutely forbid the use of inunctions, opium may be combined with one or the other of the above formulæ in sufficient quantity to control the colic and diarrhœa until the full dose is ascertained. It should then be withdrawn. I may, however, say here as appropriately as anywhere, that I believe the use of opium in conjunction with mercurials in syphilis to be an unsafe practice. It has the high indorsement of Mr. Hutchinson, who says that Dover's powder may be combined with his favorite gray powder "if necessary." He sounds no note of warning, but it can not be denied that the general effects of the drug in the average case are undesirable. It tends to constipate, to reduce appetite, and to lessen eliminative processes, including the secretion of sweat and of urine. It renders uncertain the amount of mercury actually being absorbed, and it must never be forgotten that *the essential point in the treatment of syphilis is the administration, during a sufficiently long period, of the largest dose of mercury which can be taken and absorbed without prejudice to the general health.*

Merely to order that a certain dose be swallowed, and to provide for its safe escort under an opiate guard from one end of the alimentary tract to the other, is not to treat syphilis efficiently or intelligently. In larger doses opium is, of course, not only objectionable for the above reasons, but dangerous from the possibility of the patient's becoming habituated to and dependent upon it.

When I order it on account of the impossibility of using inunctions, I prefer to prescribe paregoric, and to tell the patient to take with each mercurial pill the smallest number of drops which he finds will prevent griping and diarrhœa. In this manner, better than by combination with the mercury or than by giving any fixed dose of opium, can the minimum quantity necessary be ascertained and employed.

Now under any of these forms of treatment, or under any method by which mercury is introduced into the system, there are certain symptoms which must be carefully watched for.

The surgeon has no intention or desire to produce salivation, and under careful management, with intelligent co-operation on the part of the patient, that accident will very rarely occur. The symptoms for which he is on the lookout are those premonitory to ptyalism. They are: (1) a thickening of the saliva; (2) an increase in its quantity; (3) a sponginess and tumefaction of the gums; (4) a feeling of lengthening of the teeth, with a little tenderness when they are brought sharply together.

It must not be forgotten that these symptoms become as fallacious and misleading as those associated with the stomach or intestines unless the hygienic condition of the mouth is fairly good. A mouth containing teeth in various stages of caries, with jagged or irregular edges, with

deposits of tartar about the fangs, with foci of bacterial infection in and between the teeth and gums, irritated by the constant use of tobacco, or chronically neglected as regards the employment of the toothbrush, toothpick, and *rinse-bouche*, is in a condition to react violently to doses of mercury at a point far below the normal physiological susceptibility of the tissues.

If it is necessary to begin the treatment of syphilis in a patient with a mouth in such a state, its defects must be corrected at the earliest possible moment, and, if need be, the accurate determination of the proper dose postponed until later. In the majority of cases, however, and especially if the time of waiting for the appearance of constitutional symptoms be utilized as has been suggested (see p. 732), the mouth offers the safest and most reliable indication of the tolerance of the normal cells of the organism to the presence of mercury in the blood and tissues.

If any or all of the above symptoms appear and are unmistakable, the dose should be at once reduced, at first to two thirds, later to half that dose, if the persistence of these symptoms indicates a further reduction. This is then the standard dose, to be continued, except at certain intervals to be mentioned presently, over a period varying from two to three years.

If during this time there is an outbreak of syphilis, no matter how mild or insignificant, the dose should be at once increased to the "full dose"—i. e., that under which pyralism began to appear—and this should be continued until the symptoms vanish, or until salivation is so distinctly threatened that diminution of dose becomes necessary. Whenever during the mercurial treatment the mouth, tongue, teeth, or gums become sore or tender, a mouth-wash of a saturated solution of potassium chlorate alternating with one of boric acid will serve a valuable purpose, and, indeed, may be used at intervals with advantage as a prophylactic, even in the absence of all symptoms of mercurialization. The treatment of well-developed salivation will be found in the section on The Poisonous Effects of Mercury (see p. 745).

The patient's weight at the beginning of treatment should be noted, and any subsequent variations observed and recorded. Those cases do best in which it increases or remains stationary. Those associated with rapid emaciation are usually the most dangerous and difficult of management.

If everything goes well, the symptoms which existed when treatment was begun will subside or disappear. The post-cervical, epitrochlear, and even the inguinal glands will grow smaller, though a certain amount of induration and enlargement will be persistent. If an eruption is present it will fade. If the beginning of treatment has preceded the exanthem the latter may be much delayed, but rarely fails entirely to put in an

appearance. It may do so, however, as has been shown by a number of recorded cases.

For some years it was my custom to continue this treatment without modification for eighteen months; then to give "mixed treatment," mercury and potassium iodide, for six months; and then in the absence of symptoms to stop treatment altogether. I have, however, recently been more and more impressed with the necessity for *full* treatment and over *long* periods. On the one hand, my experience and observation corroborate Hutchinson's statement that "some of the most severe outbreaks we ever witness occur in those who have been rapidly cured by a short ptyalism in the early stage and have then left off the remedy" (*op. cit.*, p. 52), i. e., in cases treated fully but briefly. On the other hand, I am equally sure that Taylor is correct in his conclusions, although I do not agree with some of his reasons therefor (see p. 732), that a long-continued but feeble and insufficient treatment is even less effective than the short, vigorous courses which Hutchinson condemns. When an insufficient dose is conjoined with the interrupted system of treatment the results are only less disastrous than those obtained by the expectant or by the "opportunistic" system of treatment.

By way, therefore, of making certain that a proper quantity of mercury was being absorbed, I have of late years interrupted its administration by the mouth at stated periods, in order to employ it by inunction, not because I think any "tolerance" between the drug and the active cause of the disease has been established, but for the reason that its absorption from the digestive tract may diminish in course of time, and because the interval of rest is frequently beneficial to that tract. I therefore stop its internal administration at the end of three months. I go on, however, with an equivalent dose of mercurial ointment (℥j to 3j), used after the method to be described presently (see p. 754). After two weeks' inunctions I return to the mouth treatment, and this alternation is continued during a period of two years. In this time the patient has about twenty months' internal treatment and four months' inunction.

At any time, however, that a syphilitic symptom is persistent and resists the "full dose" by the mouth, I withdraw the latter and substitute inunctions, or occasionally use both. If these fail, hypodermatic medication must be resorted to, and will be described later (see p. 759).

The routine use of the iodides in syphilis should begin at about the end of the second year in an uncomplicated case, and should continue for about six months. The theoretical reasons for their employment are not quite so clearly established as is the case with mercury. They are most useful in the stages and conditions of syphilis in which it has ceased to be contagious or inoculable or transmissible, and in which, therefore, the specific microbe is presumably absent from the tissues and the gen-

eral circulation. For that reason the iodides do not appear to have a bactericidal or antidotal influence comparable to that of the preparations of mercury, nor does their behavior in relation to other micro-organisms favor this view. Furthermore, they are of little value in the early stages of syphilis when such an influence would be most potent for good. On the other hand, it seems probable that in the conditions which indicate the employment of the iodides, there is such an excess of cell-growth and accumulation either from renewed activity in the residua of antecedent disease, or from a crippling or obliteration of lymphatics due to the long-continued hyperplasia and irritation of the secondary stage (Otis), that stimulation of the absorbent system becomes the prime indication, and that iodine and its compounds meet it better than any other drugs at our command. The fact that they are more useful when given in combination with mercury does not militate against this view, as the influence of the latter in promoting destructive metamorphosis, fatty degeneration, and other retrograde changes in imperfectly organized exudates is well known, and would, of course, aid in the preparation for resorption and in its accomplishment. Be this as it may, the clinical reasons for giving iodides in the later stages of syphilis and in the presence of certain phenomena at any stage are at least as cogent and convincing as those which lead us to the administration of mercury.

Mixed Treatment.—I do not know a better formula for ordinary use than the old one containing sarsaparilla, although I have no faith in the so-called “alterative” qualities of this drug. It serves a useful purpose, however, in disguising the taste of the iodide, but it may be omitted if it is in itself disagreeable to the patient:

℞ Hydrarg. biniodidi	. . . . .	grs. ii j
Potassii iodidi	. . . . .	3 ij
Syr. sarsaparillæ comp.	. . . . .	f ʒ v j.

M. S. Teaspoonful in three ounces of water four times daily.

If this seems to disagree or becomes very distasteful, the iodide may be given in compressed pills, and the mercury in pills or by inunction. Occasionally the other iodides are more easily digested than the potassium salt and sometimes a combination of the three iodides, as in the following formula, is more useful than any one of them singly:

℞ Potassii iodidi	
Sodii iodidi	
Ammonii iodidi	. . . . . āā grs. xcv j
Syr. aurantii cort.	. . . . . f ʒ j
Aquæ	. . . . . f ʒ v.

M. et S. Teaspoonful freely diluted four times daily.

A formula which has the indorsement of Mr. Hutchinson, as efficient and seldom disagreeing, contains in each dose one-sixteenth grain of bi-

chloride of mercury, four or five grains of iodide of potassium, and half a drachm of sal volatile.

The symptoms which indicate the *early* use of the iodides are chiefly those known as "precocious"—i. e., those which in ordinary cases appear at a much later period, and will be found to affect chiefly the fibrous or connective tissue, the bones or the important viscera. All cerebral phenomena thought to be due to syphilis, whether they are believed to result from endarteritis, from gummata, or from diffuse infiltration of meningeal or other structures, indicate the prompt addition of the iodides to the treatment. So, too, does the appearance of nodes, or of gummata of the soft parts, or of extensive ulcers, etc. The dose of the iodides, like that of mercury, but even more so, varies with the individual. Some persons can not take the doses given above without the immediate appearance of the toxic symptoms presently to be described; others are peculiarly tolerant. We know definitely, however, that the production of such symptoms is not an indication that the full physiological or therapeutic effect of the drug has been obtained, and it is a good rule to increase the dose gradually but steadily until at least the beginning subsidence of the symptom which led to its employment.

Hygienic Measures.—During all this period the general hygiene of the patient must be carefully looked after, and is only secondary in importance to the mercurial treatment. Recent researches have shown that in bacterial infection of almost every variety the gravity of the results is influenced by two factors: 1. The dose or quantity or number of the micro-organisms originally inoculated. 2. The resistant power of the tissue-cells of the organism, the index of which is found in the general health and strength of the individual. It is probable that "malignancy" in constitutional syphilis, like phagedena in chancre or chancroid, depends not upon any peculiarity of the infecting material but rather upon an excessive dose on the one hand with defective vitality on the other. Insufficient treatment is in effect equivalent to the former condition, as permitting the uninterrupted multiplication of the bacillus with accumulation of its tissue products. Injudicious or excessive treatment, by its prejudicial effect on the general health, brings about a diminution of the "*vis medicatrix naturæ*" which modern science has converted from a figment of the imagination into a well-recognized and powerful therapeutic agency.

The patient will usually need some detailed advice as to diet, mode of life, etc., and much of this may be given with advantage, as soon as the diagnosis is assured. It may be summarized as follows: He should avoid overwork, mental strain, undue exposure, excesses of all sorts. He need not practice total abstinence from alcohol, but should drink only light wines at meals, and in great moderation. The less tobacco he

uses the better will be his chance of escaping mucous patches of the mouth, tongue, and throat, laryngitis, ulceration of the Schneiderian membrane, etc.

If any of these exist, or if a tendency to their recurrence has been distinctly shown, tobacco in all forms should be positively interdicted. Sexual intercourse should be guarded, for the sake of the participant and of possible offspring who may be infected and will probably through the placental circulation infect the mother. It need not be prohibited as in itself injurious, but should certainly be moderate.

The hereditary tendencies and personal diathesis of the patient should be studied. Every depressing influence acts on the side of the disease. One of the most prejudicial is tuberculosis in the form recognized clinically as struma. While the old idea that struma and syphilis are essentially identical has had no distinguished supporter since the elder Gross, and is now not tenable, there can be no doubt that the two conditions react upon each other to the great disadvantage of the patient, and that strumous patients are especially liable to the development of deep and obstinate ulceration, to osteitis and caries, and to various visceral changes. A tubercular family history should therefore be regarded as an indication for special hygienic precaution. The patient should, if possible, spend a part of each year at the seashore or in mountain air; wet feet, chilling of the surface, sitting in draughts, etc., should be particularly guarded against, as should traumatism, especially bruises of the subcutaneous tissues and strains of the larger joints.

The diet should be rich in digestible fats and carbohydrates. Pulmonary and general gymnastics should be employed. Emulsion of cod-liver oil and the iodide of iron are the most useful adjuvants to the formal specific treatment in such cases.

Gout and rheumatism, hereditary or acquired, have always appeared to me to influence unfavorably the course of syphilis. They predispose to vascular degeneration, to cerebral diseases secondary to endarteritis, to troublesome papulo-squamous syphilides, especially the palmar and plantar varieties, to iritis, and to periosteal nodes and various other affections of fibrous tissue. Such patients should have a strictly regulated diet list, should be told to eat sparingly of dark meats and of sugars, to drink freely of Poland or Lithia water, and to eschew sweet wines, malt liquors, etc. They may with advantage be given occasional short courses of the salicylates, and should have the iodides added to their mercurial treatment at an unusually early period.

If the patient is of the neurotic type the preliminary advice should be particularly directed to the avoidance of worry and anxiety. The prognosis should be put in as cheerful a way as seems justifiable; difficulties and dangers should be minimized and restrictions made light and easy,

and treatment as unobtrusive as possible. Long hours of rest are particularly desirable in such patients. Strychnia and phosphoric acid are useful adjuvants to the medicinal treatment.

Intercurrent diseases, such as malaria or influenza, must of course receive the usual attention, and should be treated as would be proper in the absence of syphilis, although they may render necessary some modification of the systematic medication; occasionally they lead to a resort to the hypodermatic method (see p. 759).

A description of the methodic or routine treatment of syphilis would be incomplete without a more detailed account of the toxic symptoms produced by the two drugs chiefly employed—mercury and iodine—as it has been repeatedly stated that those symptoms must be carefully watched for and avoided.

The Toxic Effects of Mercury.—Hydrargyris.—1. *Acute.* During the employment of any preparation of mercury, however administered, whether by the mouth, by inunction or fumigation, or hypodermatically, certain symptoms may make their appearance, indicating that the limit of tolerance of the system to the drug has been reached. The first and most important are those relating to the mouth. They consist, in the mild form in which only will they be seen by the careful practitioner whose orders are complied with, of a slight inspissation of the saliva, which becomes stringy, tough, and tenacious, and increased in quantity; a little congestion and sponginess of the gums, which bleed readily when touched; slight tenderness of the teeth, especially of the posterior molars, when the jaws are brought together with a snap. Marked metallic taste in the mouth and fetor of the breath indicate a slightly more advanced stage of mercurialization; while ulceration of the gums, congestion and œdema of the whole oral mucous membrane, loosening of the teeth, an enormously increased flow of saliva, swelling of the tongue, the soft palate, the submaxillary and parotid glands, etc., are the symptoms of full salivation, produced intentionally by our not very remote predecessors in the treatment of syphilis, but rarely seen at the present day. The disrepute of mercury with the laity, which lasted for so many years and is yet by no means effaced, may be readily understood when we picture the condition of such a patient, unable to masticate, to swallow, or even to speak, with the saliva flowing at the rate of pints daily, the breath frightfully offensive, the strength failing rapidly from malnutrition, etc., and remember that in addition he was kept in a close, overheated, unventilated room, and was sweated, purged, and even bled in addition! Fortunately, we have left far behind us that sort of empirical and unreasoning therapeutics, and except in the unusual cases where a dispensary patient fails to report for observation and at the same time overdoses himself, we almost never see well-developed cases of salivation.

Occasionally, as a result of idiosyncrasy, dermatitis will develop during mercurial treatment. A remarkable case of acute cutaneous mercurialization is reported by Mauriac (*Gaz. des Hôpitaux*, August 9, 1892.):

The patient, a young man of eighteen years, suffering from papulo-erythematous syphilide, left the hospital almost cured after a course of treatment consisting of 0.03 gramme (one half grain) of protiodide of mercury thrice daily; at no time showing any mercurial symptoms. However, in a few days he had a second outbreak of the syphilis, more severe than the first, and returned to the hospital, where he was treated this time with inunctions of one drachm (four grammes) of mercurial ointment daily. His skin was naturally very soft and delicate, and at the end of the fourth day the skin in those parts which had been rubbed with the mercury became a lively red, as in eczema rubrum, and in less than twenty-four hours the entire surface of his body was covered with a scarlatiniform eruption of an extraordinary, intense color. The temperature rose quite high, and the pulse became very rapid. A remarkable fact was that, in this mercurial intoxication, the mucous membranes were not affected in the slightest degree, and there was absolutely no salivation. On the second day the papulous syphiloderm seemed submerged under this violent erythematous seizure; but more remarkable yet, on the fourth day it vanished as if by enchantment. Such rapid cures are occasionally effected by inoculation of erysipelas, but rarely by four days of mercurial inunction. The fever and erythema subsided in five days, followed by desquamation of the epidermis. Mauriac regards this cure as effected not so much by the mercury acting upon the syphilitic process directly, as by the fever produced by the mercury. Nor does he think that the cutaneous irritation had much to do with effecting a cure; otherwise we would find cures effected by the application of croton oil, or other irritant. Morel-Lavallée has reported a case of mercurial fever and erythema which endangered life not only by the lesions of the skin, but also by visceral and cerebral hyperæmia. It may be assumed, therefore, that an acute, general, mercurial erythema, with febrile reaction, is sometimes a very favorable event in the treatment of syphilides; under the double action of the fever, and perhaps the erythema, the cutaneous relapses of syphilis disappear with an unexampled rapidity, which can not be equaled by general or local specific treatment. However, the cure is unhappily but short-lived.

Hutchinson has reported (*op. cit.*, p. 173) a case in which during the co-existence of the chancre and a papular or small pustular syphilide the administration of mercury was followed by rapid extension, inflammation, and ulceration of both chancre and syphiloderm, so that the former became almost phagedenic and the latter rupial in character. The withdrawal of mercury and the substitution of potassium iodide resulted in the immediate subsidence of these symptoms.

2. *Chronic*.—In other cases the whole digestive tract suffers, and the general constitutional effects of the drug are prejudicial. The patient becomes morose, gloomy, and depressed, or weak, nervous, and hysterical. The appetite fails, there is a chronic catarrhal condition of the gastrointestinal mucous membrane; flatulence, heartburn, eructations, and even vomiting are common; emaciation begins and is progressive; albuminuria

may appear and great muscular weakness and general debility exist. The only difficulty I have found in relation to these cases is that of diagnosis, but this is sometimes a grave one. The same group of symptoms, or a very similar group, may be produced by syphilis itself, and may indicate insufficient rather than excessive treatment. The mental phenomena certainly are as frequently due to the patient's knowledge of the character of his disease and to the morbid introspection and unwholesome imaginings to which this often tends as to any effect of mercury. I have never been able to differentiate to my own satisfaction the "awful gloom" which is described as a rare symptom of the ingestion of mercury (Keyes, *op. cit.*, p. 559), and the similar mental state which is due to syphilis, or rather to the consciousness of the existence of syphilis, for I have seen it just as marked and as profound in syphilophobia, when no infection of any sort had occurred and no mercury had been given. The other symptoms above mentioned—*anorexia*, *emaciation*, etc.—may also result from the disease or from the depression produced by it. If, however, the patient has no evidence of visceral syphilis and is not brooding over his condition, but has been taking mercury by the mouth for long periods and in full doses, the above group of symptoms may usually be attributed to the drug.

Lang (Centralblatt für die gesammte Therap., January, 1892), at the International Congress at Berlin, emphasized the necessity for the close observation of all symptoms, both previous and attendant, in cases where any of the preparations of mercury are exhibited. When a syphilitic patient is afflicted with any other severe malady, such as *nephritis*, *tuberculosis*, *malaria*, etc., and when he has any ailment, confessedly independent of syphilis, he thinks there should be no mercurial treatment until the other conditions have been corrected. If there be merely a derangement of the intestinal canal, this must be regulated before any mercury is administered. Kidney affections, which usually develop in the early stage of the generalization of the disease, are to be considered, where other etiological factors may be excluded, as either the direct effect of the syphilitic virus in the substance of the kidney, or as the excretion of the metabolic products induced by the virus. In the former case the *nephritis* may be infectious; in the latter, purely toxic, or syphilo-toxic. Such kidney affections demand immediate antisiphilitic treatment, often mercurial; but it must be remembered that *nephritis* may be of mercurial origin, and this, according to Lang, occurs oftener than is commonly supposed. Fürbringer has shown that the ordinary mercurial treatment can, in fact, induce the secretion of albumin. Lang has found albuminuria occurring not infrequently during even a mild use of mercury, so that the presence of albumin in the urine can afford as decided a symptom of poisoning as affections of the mouth or of the intestinal tract. Mercurial treatment, therefore, howsoever administered, demands the closest attention, not alone to the oral region and to the intestinal tract, but to the kidneys.

On the other hand, Petersen (Berlin klin. Wochen., No. vi. 1892, p. 129) has made over three thousand analyses of the urine of two hundred syphilitics. His conclusions are as follows: 1. It is necessary to examine the urine of all syphilitic patients on their admission to hospitals or clinics. 2. It is important to

ascertain whether the albuminuria is false or true. 3. Albuminuria occurs in the first and second stages of syphilis in the proportion of 3·8 per cent, and 5·8 per cent in tardy syphilis. 4. In treating syphilis by the salicylate of mercury, albuminuria is very rarely observed. It is unjust to hold that mercury causes albuminuria, as maintained by Guntz. It is probable that the friction of mercurial inunctions may have some causative influence. 5. The elimination of mercury by the kidneys does not produce albuminuria. 6. Syphilitic albuminuria disappears under mercurial treatment.

Bouchard has reported a fatal case. Gubler believes that mercurial albuminuria is a constitutional rather than a renal condition. Ollivier draws a parallel between mercurial and lead poisoning as regards nephritis.

Treatment of Mercurial Intoxication.—Salivation may best be avoided by attention to the condition of the teeth, mouth, and gums, the frequent use of a soft toothbrush with some astringent mouth-wash, the avoidance of any collection of food between the teeth by the proper employment of the toothpick, or of silk thread run between teeth that are very closely set together. The grave form which has been described is never fulminant, or even very sudden, in its onset. The premonitory symptoms can always be recognized. They indicate the immediate reduction of the dose which is being taken, or, if they are a little more severe, may necessitate the temporary stoppage of mercurial treatment.

As to the effects of mercury upon the nervous system, I have seen very little in my own practice of the grave conditions which have been ascribed to it. I must confess to considerable skepticism as to the existence of many of them, and to absolute incredulity as to their frequent occurrence. As it may be possible, however, that where treatment which I would regard as unnecessarily vigorous has been employed, these symptoms, or some of them, may occur, I copy the following *résumé* of the views of Maréchal (Thèse de Paris, 1885) without further comment:

“1. Slow mercurial poisoning gives rise to a certain number of nervous troubles which constitute the greater part of its symptomatology. 2. These nervous troubles can be attributed, in part, to the presence of mercury in the nervous centers, where it has frequently been found, and in part to lesions of the cerebro-spinal system, which have been described by Wising. One of the most curious characteristics of these lesions is the persistence of the axis cylinder in the altered regions. This last condition is found in the lesions of sclerosis in plaques, which, moreover, in its clinical features shows some analogies with cerebro-spinal hydrargyrosis. 3. The nervous troubles of hydrargyrosis are: (a) Disturbances of motion; trembling, analogous to that of sclerosis in plaques; convulsive phenomena of various kinds (cramps, epileptiform attacks, etc.), choreic movements, apoplecticiform ictus, paralyzes presenting the features of paralysis of cerebral origin. (b) Disturbance of sensibility; anæsthesia, presenting the features of anæsthesia of cerebral origin; painful phenom-

ena, of which the most constant are the arthralgias and cephalalgias. (c) Disturbances of a psychological nature, which are at first excessively emotional; disturbances of sleep, vertigo, and toward the last dementia, very much resembling senile dementia. 4. In general, these nervous disorders persist for a very long time; they may be greatly benefited, but only rarely can an absolute cure be obtained" (Journ. Cut. and Gen.-Urin. Dis., vol. iv, 1886).

The two remedies which are most useful when pytalism has reached a stage which requires special treatment are potassium chlorate and atropia. The former may be used in saturate solution as a mouth-wash, a small quantity being taken internally. I usually prescribe at the same time a disinfectant and astringent mouth-wash to be used alternately—a favorite formula being the following :

R Acid. boric.
 Acid. tannic āā ∅ iv
 Mel. rosæ f ̄ ij
 Aquæ f ̄ vj
 M. et S. Use as a mouth-wash.

The atropia should be given by the mouth, in the shape of tablets or powder, allowed to dissolve on the tongue. The dose should be a very small one, frequently repeated, until the characteristic effect upon the pupil begins to show itself.

R Atropiæ sulphat. gr. $\frac{1}{2}$
 Sacch. lactis q. s.
 M. et ft. chart. no. x.
 S. One powder every three or four hours.

The same remedies are of value in the most severe forms of salivation, and to these should be added the local use of silver nitrate in solution (twenty or thirty grains to the ounce of distilled water), mouth-washes of more decided antiseptic value, as potassium permanganate, sprays of hydrogen peroxide, etc. Heat (see p. 789), and the use of diaphoretics, are strongly recommended, and by favoring eliminative processes should certainly be useful.

In the chronic forms of hydrargyrisim, the diagnosis once being assured, the withdrawal of the drug is, of course, indicated, and this should be followed by scrupulous attention to hygiene, change of scene and air, a regulated diet, and the administration of ferruginous and other tonics. If it is necessary to begin again the use of mercury, it should be given by inunction or hypodermatically.

The Toxic Effect of the Iodides—Iodism.—The term *iodism* should be understood to include the various forms of iodic intoxication, the most common of which are gastro-intestinal irritation, coryza, lachrymation, mental depression, tinnitus aurium, and a pustular eruption (acne)

upon the cutaneous surface of the body. While this pustular eruption is the most frequent exanthem produced by the iodides, it is true, as taught long ago by Ricord, that there is hardly any form of acute cutaneous eruption which they may not excite—erythema, eczema, and herpes being not uncommon. Bumstead (*American Journal of Medical Sciences*, p. 99, July, 1871) has described a case of pemphigus produced by the administration of the iodide of potassium, and states that Boinet quotes Cazenave as having seen a similar case. Since then, Tilbury Fox, Duhring, Finny, Duckworth, Thin, and others quoted by Dr. George F. Duffey (*The Dublin Journal of Medical Sciences*, April 1, 1880), in an article upon iodic purpura, have all recorded similar cases. Purpura, the most profound result of the influence of the iodide upon the skin, has been observed in a large number of cases, and has been very fully described in the article above mentioned. It seems probable that these various forms of skin diseases are to be referred to the liberation of a lesser or greater quantity of free iodine in the tissues, although this has by no means been demonstrated. Binz (*Revue des Sciences Médicales*, tome v, p. 485) believes that, in the presence of the oxygen of the blood and the carbonic acid of the tissues, iodide of potassium is transformed into the bicarbonate of potassium with the liberation of free iodine. Kaemmerer describes this change as occurring in the blood and not in the tissues.

Thin (*Medico-Chirurg. Transactions*, vol. lxii, p. 199, 1879) says that “the rationale of iodide eruption seems to be that there are conditions in which iodine, when present in the blood, attacks and disorganizes the blood-vessels at certain localized points. As a result of this injury to the wall of the vessel there is an escape of blood fluid into the surrounding tissue.” He thinks that the papules of iodide acne, pemphigus, and purpura represent different degrees of involvement of the blood-vessels. The first is due to a limited œdema, with congestion; the second, to an effusion of serum, with more or less of the formed elements of the blood; the third, to destruction of the wall of the vessel and hæmorrhage. Microscopical examinations in cases of death during the existence of iodide eruptions have seemed to confirm these observations. Duckworth has called attention to the relation of chronic nephritis to iodism, believing that, when the elimination is reduced by kidney disease, the drug is maintained for a longer time in contact with the tissues. Dr. George Johnson has noted the frequency of iodism in cases of chronic Bright’s disease (*Lewin on the Untoward Effects of Drugs*, p. 111). Stewart, of Montreal (*Therapeutic Gazette*, March 15, 1889), makes the same assertion, and says there is abundant proof for the statement that “the less the elimination through the kidneys, the greater the danger of iodism.” (See further, p. 794 *et seq.*) Ehlers (*Hospitalstidende*, 1889, vol. i) has experimentally confirmed these views.

Mr. Hutchinson represents the views of the majority of syphilographers when he states that "the skin eruptions which may be produced by the iodides are very various in their characters; they are certainly due to idiosyncrasy, and have little or no relation to the dose employed"; and again, "the iodide of potassium is one of those remedies of which it is curiously true that in many persons the dose makes little or no difference in its effects; one grain may produce iodism in some, while one drachm will not in others. . . . There is, perhaps, no drug in which the influence of idiosyncrasy comes more frequently or more permanently into play. To some patients even very small doses are poisonons, while a large majority can take indefinitely large ones with impunity."

In the doses which have been recommended in the ordinary treatment of an average case of syphilis a certain proportion of patients will have no symptoms at all from the use of the iodides; a larger proportion will be troubled with a coppery taste in the mouth, and with an acneiform eruption affecting the face by preference but often widely distributed; coryza, lachrymation, slight conjunctivitis, are common, as are dyspepsia, heartburn, and other g astro-intestinal symptoms. A far smaller proportion of cases will have general swelling of the mucous membrane of the pharynx and larynx, sometimes going on to œdema of the glottis, which, in one reported case, was so severe after only four ten-grain doses had been taken as to necessitate tracheotomy; the usual small papular or pustular eruption may in such patients become of great size and depth, resembling a crop of furuncles, or it may become hæmorrhagic or purpuric in character.

The treatment of these conditions varies with their gravity. In the most severe forms, of course, the drug must be instantly withdrawn, and active tonic treatment instituted. Digitalis in combination with other diuretics is indicated. It may be given in such cases with Basham's mixture with great advantage. Small doses of arsenic are useful. Hygiene must be carefully looked after.

In the milder cases of iodism, if it is important that the drug should be pushed, it must not be forgotten that the present intolerance or idiosyncrasy may disappear if we persevere. Such cases are common in the experience of every syphilographer, and should prevent a too early withdrawal of iodide treatment if there is a clear indication for it. In these lighter cases a few drops (two to four) of Fowler's solution, with each dose of the iodide, will often control the iodism perfectly. The gastro-intestinal symptoms may be very persistent and annoying, but *large* dilution of the iodide solution with some bland fluid like albumenized water or weak infusion of flaxseed will often control them.

The various formulæ and methods for administering the iodides will be described later. The important question of the value of iodism or its

absence in the diagnosis of obscure cases of syphilis will also be discussed in the section on the use of the iodides (see p. 794).

THE METHODS OF ADMINISTERING MERCURY.

We may now consider systematically the various plans of administering mercury and their relative advantages, and also the different preparations which may be employed: 1. By the mouth. 2. By inunction. 3. By hypodermatic injection. 4. By vaporization. 5. Mercurial and thermal baths; heat.

1. By the Mouth.—I have already described the preparations which I prefer to give by the mouth as routine treatment, and the mode of their administration.

A few of the other salts of mercury which have been used by the mouth, and a mention of some of the formulæ preferred by various syphilographers, may be of use, although I am strongly of the opinion that with the protiodide, gray powder, and the bichloride in varying doses and vehicles, there will rarely be need to employ other drugs for mouth ingestion.

The *tannate of mercury* has been used by Allen (N. Y. Medical Record, No. xii, 1892, p. 6) in fifty cases. He describes it as a yellow-green powder, without taste or smell, insoluble as long as it is not decomposed. Its simplest mode of preparation consists in precipitating a solution of nitrate of mercury by a solution of sodium tannate.

It may be given in its pure state as a powder alone, or combined with a few grains of tannin, or mixed with sugar or licorice powder. For children it can be given in milk. The dose is half a grain three or four times daily, or as often as symptoms indicate up to the point of tolerance. Petrini (Medical News, August 15, 1891) recommends the tannate in doses of two thirds of a grain made into a pill with extract of gentian and given at mealtime. The dose is doubled after ten days. Schwimmer (Die Grundlinien der heutigen Syphilis Therapie) has used it with good effects in the same form.

Allen believes it has the following advantages over other salts: 1. It is stable, and does not decompose easily. 2. It is assimilated and eliminated with rapidity. 3. It is possible to give it in large doses, without fear of dangerous complications, as its absorption and elimination are so speedy. 4. It does not produce ptyalism as easily as do the protiodide and calomel, though in some cases slight doses will do so. 5. Its employment is not so frequently followed by diarrhoea and gastro-enteritis, as is the case with the bichloride and protiodide, the tannate not being decomposed until it reaches the alkaline fluid of the small intestine. 6. It is well tolerated by children.

Lustgarten has also employed the tannate, and believes that its chief value lies in the fact that it will pass through the stomach without being acted upon by the acids therein contained. When it reaches the duodenum, the alkaline juices transform it into minute metallic globules and it is then easily absorbed, appearing in the urine twenty-four hours after ingestion. He does not depend upon it exclusively, but adheres to the modified intermittent treatment. He uses thirty to forty inunctions after the first appearance of secondary

symptoms, and then gives five grains daily of the tannate. The dose begins with one grain and rises gradually to five grains, and a course of treatment consists of one hundred to one hundred and fifty grains. He has had no unpleasant digestive symptoms. His formula is the following:

℞ Hydrarg. tannici oxydulat. gr. jss.
 Acid tannici,
 Sacch. lact. āā gr. ¼
 M. ft. in pulv.
 S. One powder two or three times daily in gelatin capsules.

Or he uses the well-known soluble pills of one grain each, or one grain compressed tablets.

Fournier objects to the tannate as he does to the peptonate, on the ground that they are indefinite compounds, and believes that they will be quickly forgotten.

The *succinimide of mercury* has been employed and recommended by Julien in pills of one third grain to one half grain, given twice daily. He has seen no gastric or other ill effects produced by it, and finds it generally well supported.

Neumann reserves the administration of mercury by the mouth for cases in which there are slight relapses, and for the purpose of keeping up a mild mercurial treatment when no symptoms are present. For the severer symptoms he prefers inunctions or hypodermatic injections. He uses the following formulæ, emphasizing the need for great care as to the hygiene of the mouth, and giving the medicine after meals:

℞ Calomel grs. v
 Sacch. lact. 3 ss.
 M. et in chart. no. x div.
 S. One powder after each meal.

When the calomel produces diarrhœa, he adds opium in the proportion of half a grain daily.

He finds that sublimate acts more quickly than calomel, but also more drastically:

℞ Hydrarg. chlor. corros. gr. jss.
 Aquæ dest. f ¾ iv
 M. S. Two to three teaspoonfuls daily.
 ℞ Hydrarg. chlor. corros. gr. jss.
 Sodii. chlor. 3 i
 Aquæ dest. f ¾ vj
 M. et S. One tablespoonful morning and evening.

Van Swieten's mercurial liquor is frequently of service:

℞ Hydrarg. chlor. corros. gr. jss.
 Spir. vini rect. f ¾ iijss.
 M. et S. One teaspoonful in milk or wine morning and evening.

Or in pill form:

℞ Hydrarg. chlorid. corros. gr. jss.
 Ext. opii aq. gr. j
 M. et in pil. no. xx div.
 S. Two pills daily, increasing to five.

The most frequently used mercurial preparation he considers to be the protiodide of mercury:

℞ Hydrarg. ioidid. vir. grs. vj
 Opii gr. ivss.
 M. et in pil. no. xx div.
 S. Two pills each morning and evening.

Of the more recent prescriptions he prefers the following:

℞ Hydrarg. tannici oxydul.,
 Sacch. alb. āā gr. xlv
 M. et in chart no. xxx div.
 S. One powder t. i. d.

Also:

℞ Hydrarg. salicylat. gr. v
 Ext. quass. q. s.
 M. et ft. pilulæ no. xxv.
 S. Two pills twice daily.

Or,

℞ Hydrarg. thymolat. gr. xv
 Ext. opii. gr. vj
 M. ft. pil. no. xxx.
 S. Three pills daily.

The *carbolate of mercury* has been used by Gamberini and by Sadoc in doses of a third of a grain, two to six times daily. They report excellent results (Ann. of Univ. Med. Sci., 1888, p. 463).

The *salicylate of mercury* was first used in 1886, by Silva de Araujo, who was led by Gamberini's advice to consider the possible value of uniting two bactericidal remedies in one drug. He reports remarkably good results from doses of from about one third to one grain, three to six times daily. The drug was largely employed by Brazilian specialists, particularly in syphilitic iritis and other specific eye troubles. They claim that in many forms of obstinate syphilis it has succeeded where other drugs have failed. Buchler (Medical News, August 15, 1890) and Szadek add their testimony as to the value of this preparation. Neumann has reported twenty cases in which it acted satisfactorily.

Ipecac (one eighth grain) in combination with the *biniodide of mercury* (one sixteenth grain), in the form of tablets, has been said by Curtis (Journal of Respiratory Organs, September, 1890) to prevent effectually any unpleasant effects upon the mucous membranes. The above dose may be given, he says, ten to twelve times daily without producing any gastric or enteric symptoms.

Zittman's decoction has been used for so many years that, although it is an example of the polypharmacy of the days of old, and although its virtues, if it has any, are probably due to the large quantity of liquid taken with it and to the accompanying inunctions, it seems proper for the sake of completeness to give its formula:

℞ Sarsaparilla $\frac{7}{8}$ 12
 Water 3 gals.
 Macerate for twenty-four hours.

Put in a linen bag:

White sugar	3 6
Alum	3 6
Calomel	3 4
Prepared cinnabar	3 1

Hang the linen bag in the liquor and boil down, while adding four gallons more water, till the liquor has evaporated to two gallons. Remove the bag and add to the decoction:

Anise seeds	3 4
Fennel seeds	3 4
Senna leaves	3 1½
Licorice root	3 1½

Press and strain.

From a pint to a quart to be taken, in divided doses, during the day.

In applying this treatment Zeissl and others adopt the following plan (Hill and Cooper, p. 416): The course extends over four weeks or six weeks, and comprises strict diet and regimen, besides the inunction and daily potion of the decoction. The patient must be in bed for fourteen hours daily, and in his room for eighteen of the twenty-four. A light breakfast is given early, and one hour later a hot-water or vapor bath to procure sweating. While the skin is bathed in perspiration a rubber rubs in thirty to sixty grains of mercurial ointment, and the patient then lies for two hours, freely perspiring in the blankets. After this he rises, wipes the sweat off, and dresses in flannel under-clothing. He then takes a light meal and walks for one or two hours if the weather be dry and not very cold. In the evening he returns to his rooms, is well covered with blankets, and sweats again for an hour before going to sleep. The next day the same course is repeated. The diet is limited to one meal of meat; the other consists of fish, eggs, and vegetables; and for drink, weak tea or coffee and milk. No fruit or alcoholic liquors are allowed. The medicines given consist of a pint to a quart of Zittman's decoction during the day, and every other morning a dose of Friedrichshalle or other saline purgative.

Blue mass has been employed by many syphilographers, and used to be one of Bumstead's favorite prescriptions. It is still the second choice of Mr. Hutchinson in routine treatment (see p. 728).

Bumstead preferred the following formula (Bumstead and Taylor, p. 853):

R Pil. hydrarg.	℥ ij
Ferri sulph: exsiccata	℥ j
Ext. opii.	gr. v

M. et in pil. no. xx div.

S. One pill from two to four times daily.

If speedy action were desired, he ordered:

R Pil. hydrarg.	℥ j
Hydrarg. chlorid. mit.	℥ ss.
Hydrarg. cum creta	℥ ij
Ext. opii	gr. v

M. et in pil. no. xx div.

S. From two to three or four pills daily.

I might indefinitely lengthen this list without, in my opinion, adding much to the practical value of this article. I have given enough varie-

ties of both drugs and formulæ to permit of a wide latitude of choice, and it only remains to reiterate my opinion that in the large majority of cases the patient will be found to do well under one of these preparations I have described as preferable to all others, viz., the protiodide, the gray powder, or the bichloride.

2. Inunctions.—I was led to add the use of inunctions to my systematic treatment of syphilis by the realization of the fact that they had for years been my chief dependence in the accidents and emergencies of syphilis. Whenever during the course of the disease a patient developed iritis, or had persistent headache, or simply had an obstinate syphilide, it was my custom to add to the treatment by the mouth vigorous inunctions of mercurial ointment. The step from that to the occasional use of the same method in ordinary cases was a natural one, and the results were then so satisfactory that it soon became part of my treatment of every case.

The objections to it are obvious. Its uncleanness, the eczematous irritation to which it gives rise, and the greater attention which it draws to the condition of the patient, operate most powerfully against it in private practice, and render it difficult in many cases to have it used systematically, while in some instances it can not even be attempted. Usually, however, an explanation of its advantages as regards the probability of permanent cure, and especially in relation to the disappearance of any existing symptom, will suffice to insure its acceptance by an intelligent patient.

Whenever it is employed, whether as the exclusive method of treatment, for the relief of a threatened or threatening outbreak, or, as I have recommended, in the intervals of treatment by the mouth, the following general rules should be observed: The same precautions as to hygiene of the mouth, the digestive tract, and the individual are to be taken as in any other method of treatment. There have been in my experience absolutely no reasons for insisting upon any special precautions, as avoidance of cold, for example. There is a widespread belief among the laity, participated in by some physicians, that during a course of inunctions either confinement to the house or extraordinary precautions to avoid chilling of the surface are necessary. I have often been asked about it both by patients and by medical men. No doubt the idea has descended to us from the mediæval days so well described by Fournier, when the unfortunate patients were debarred from the least breath of air, and were shut up in superheated rooms so saturated with mercurial fumes that the very walls were black, on whom the inunctions were performed before a blazing fire, and to whom were administered, in addition, no end of tisanes, laxatives, minoratives, dissolvents, digestives, eradicates, sarsaparilla, etc. Naturally, frightful salivations followed, but they were hailed as blessings, and could be neither too intense nor too prolonged.

Astruc, a moderate in his therapeutics, ceased his friction when his patient reached the point of spitting a number of quarts a day. After the friction the patient was put to bed and clothing piled on him to create perspiration, and, as "sorrow's crown of sorrow," he was strictly enjoined to be "gay and cheerful"!

Fournier calls attention (*Gazette des Hôpitaux*, November 26, 1891) to the persistence of this old prejudice, especially in Russia and in Germany, where, he says, many patients are of the opinion that they must remain in their rooms while undergoing this treatment. This and all other precautions not already described as applicable to all forms of mercurial treatment are unnecessary.

The plan of prescribing inunctions which I have found entirely satisfactory is as follows: The patient is given a prescription for a mixture of equal parts of mercurial ointment and carbolated cosmoline. I have tried lanoline, but it is too gummy and sticky. Lard, recommended by Fournier, speedily becomes rancid, and the mixture is then very irritating. The undiluted ointment is also more irritating than the combination with one of the unguents having a petroleum basis. The oleate of mercury, which I used for a year or more some time ago, I found, as did the profession everywhere, far less efficacious than mercurial ointment.

After various experiments I have settled down to the use of the one above mentioned. It may be ordered to be put up in one lot and the proper amount withdrawn by guess at each time of using, but this is dangerously inaccurate.

It is better to employ the following formula:

R. Unguent. hydarg.,
 Unguent. petrolei carbolat. āā ȝ ij
 M. et in part. no. xvi div.
 S. Use one portion at bedtime.

The druggist should be instructed to inclose each dose in a compressible gelatin capsule, or in a "caset" of stiff paper. Fournier orders fifteen drachms of the "double" mercurial ointment made up into seven "cartouches" (eartridges), remarking that the extra drachm represents about the quantity which is lost by adhesion to the paper. This is an attempt at a degree of exactness in dosage which, in view of the uncertainty of the amount absorbed through different skins, is not essential.

I have also found it answered very well to order the pure mercurial ointment put up in the proper doses, and to instruct the patient to anoint the region to which he was about to apply it with the carbolated cosmoline. This reduces somewhat the bulk of the material to be rubbed in, and in persons who have not irritable skins is sufficient precaution against eczema, a certain degree of which is practically unavoidable. The dose

for a healthy adult varies from one scruple to one drachm daily. Most persons will bear the latter quantity very well for a course of inunctions extending over from two to three weeks. After that the danger of sudden and troublesome stomatitis as well as of annoying dermatitis increases, and the patient must be carefully watched.

I have found it well to select a number of places for the application of the ointment, and to tell the patient or attendant specifically where to begin and how to continue. Fournier's plan of using alternately the two sides of the thorax beneath the axilla must certainly, in a large proportion of cases, be followed by unnecessary cutaneous irritation. He adds, to be sure, that if the skin is unusually sensitive the antero-internal surfaces of the thighs and arms may also be employed, but I see no reason why this should not be done from the start. Then, too, the selection of a limited region of the body ignores the value of the direct application of mercury to the tissues, and by that much lessens its efficiency. Hutchinson some time ago (*op. cit.*, p. 54) said: "As regards its mode of influence in syphilis, we may reasonably suppose that it is requisite that it should be brought into contact with the cell elements concerned in the morbid process. Wherever its local application is practicable, we know that it is usually very efficient." Hallopeau thinks, indeed, that each manifestation of syphilis is a center of multiplication of the virus, a source of reinfection, which it is necessary to suppress (*Journ. of Cut. and Gen.-Urin. Dis.*, March, 1890).

While I have seen numerous cases in which the salutary effect of the local contact of the mercurial with the syphilitic lesion was pronounced and unmistakable, I do not think, on the other hand, that in the absence of localized lesions the very inconvenient method recommended by Taylor (*Hare's System of Therapeutics*, vol. iii, p. 86) need be generally adopted. He divides the body into eleven regions, and includes the head and neck, the axillæ, the groins, and the legs, parts usually covered with hair, some of which, as the axillæ have a very thin and sensitive skin, and all of which are in my experience particularly liable to develop troublesome eczema very early in the course of treatment.

Fastidious patients object strongly enough to the dirtiness of inunctions at any rate, and they should not be made unnecessarily distasteful. If papular or pustular crustaceous lesions invade those localities, I have always been in the habit of ordering local treatment, usually by means of the ointment of the nitrate of mercury, or of ammoniated mercury (see p. 803); but, in my opinion, for the routine employment of inunctions it is better to avoid them.

I accordingly tell the patient to select the most accessible hairless regions as follows: The inner surface of the thighs, the antero-internal surfaces of the arms and forearms, the sides of the thorax, the loins,

flanks, and antero-lateral surfaces of the abdomen; sometimes the buttocks, and the soles and inner surfaces of the feet. If a nurse or attendant is in charge of the case, the whole back may be included. In any event, by passing from one to the other of these regions in a specified order, the patient need not use any one of them oftener than once weekly, leaving ample time in the interval for the subsidence of skin irritations.

The time required for each inunction, if a drachm of mercurial ointment is used, should not be less than twenty minutes. If an attendant applies it his bare hands should be used. I have never known an instance of mercurialization of a rubber under these circumstances. I usually order my patients to bathe only about twice weekly during this treatment; but whenever in any particular locality marked irritation occurs, I direct that the skin there shall be at once washed clean and the following ointment applied:

R Hydrarg. chlorid. mit. 3 ij
 Unguent. zinci oxidi,
 Unguent. petrolei carbolat. āā ʒ ss
 M. et ft. unguent.

This is soothing, and at the same time keeps up mild local mercurial influence, if that is needed. In the absence of the latter indication, dusting the clean skin with ordinary rice powder, or with bismuth and starch, will usually suffice.

The best time to use the inunction is at night, before going to bed. I have not found it necessary to take any special means to promote sweating. Neumann thinks, indeed, that perspiration prevents absorption, and for that reason always orders the inunction to be used in the morning. During the treatment it is well to have the patient wear old underclothes day and night, which can be thrown away, or which need not be changed oftener than once a week.

As I have said, I employ two weeks of this treatment about once in three months in an average uncomplicated case. It may be kept up longer if there are reasons for so doing, and should undoubtedly be prolonged in the presence of relapsing syphilides of either skin or mucous membranes, or in cases in which visceral lesions are threatened. I may reiterate, however, my opinion that in ordinary—"benign"—cases of syphilis it is not necessary to employ this or any other troublesome and tiresome or painful treatment, to the exclusion of the administration of mercury by the mouth. It may be useful to append here the description given Mr. Hutchinson by a surgeon (himself a patient) of the routine method at Aix-la-Chapelle, which is so much frequented by syphilitics. It fails to corroborate Fournier's remarks (*Gaz. des Hôp.*, November 26, 1891), that at Aix-la-Chapelle the frictions are still followed by a "séance de sudation." It fails also to show any sufficient reason for resorting

to Aix for the purpose of using this treatment; but this subject will be briefly discussed later (see p. 786).

Many patients resort to Aix-la-Chapelle in order to go through a course of mercurial inunction for no other reason than the (supposed) difficulty of carrying out the treatment at home. The following directions will suffice, if attended to, to prevent serious inconvenience during such a course:

The patient should retire early to bed, and lie as long as possible in the morning.

There should be a fire in the bedroom if the weather be cold.

The ointment should be rubbed in at night. The patient should lie down naked on the bed or couch, a blanket or rug being spread beneath to prevent the soiling of the bed.

The ointment (which should be divided by the chemist into the prescribed quantities for nightly use) should be spread upon the chest and abdomen, and should be briskly rubbed in with naked hands over as large a surface as the hands can conveniently reach, for from fifteen to twenty-five minutes. A watch should be at hand to note the time. After the inunction a jersey and drawers must be put on and worn during the night, to prevent the soiling of the clothes and bed; but they need not be thick. Previously to putting them on the hands may be washed. The ointment is easily removed by free use of soap and cold water; easier still with hot water.

In the morning the body can be washed with warm or tepid water with soap. The night underclothes can be worn for a few times or a week, unsoiled clothes being worn during the day. The stain of the ointment is easily removed from garments by hot water and soap. At Aix the rubbing is always done by a trained attendant, but this is not in the least necessary.

I should at least mention the fact that some very distinguished authorities recommend the use of inunctions as the first choice for systematic treatment throughout. Among these are Schwimmer (*op. cit.*); Kreis (Med. Correspondenzblatt des Württemberg. ärztlich. Landesvereins, Stuttgart, March, 1891), who thinks that inunctions give the best therapeutic effect, with the fewest accompanying disturbances, directs that the internal administration of mercury should be reserved for married women who do not suspect the nature of their malady, for those whose skin is very tender, and for those who want to conceal their disease. He recommends, in order that the skin may not be irritated by the mercury, that the ointment be prepared with benzoated lard, and that, twelve hours after the rubbing, the part be washed and powdered.

Kaposi (*Wiener med. Presse*, June 8, 1890) thinks that inunctions are far preferable to any other method. He adds: Administered in this way, the drug penetrates into the subcutaneous tissues, is transformed into soluble albuminoids, and, coming into contact with the specific virus, destroys its power. It is finally eliminated through the capillary vessels of the salivary glands, the mucous membrane of the mouth, stomach, and bowels, the liver, and the kidneys. The rubbing should not be pushed

to salivation, but should be intermitted on the first sign of irritation in the mouth, as denoted by sponginess of the gums and thickness and ropiness of the saliva. This last sign is most readily elicited by causing the patient to open the month, when the salivary secretion can be seen drawn out in strings between the teeth and the tongue.

Kaposi thinks that certain people exhibit an idiosyncrasy toward inunctions—at times an eczema developing over the entire body—and that in these cases another method of treatment must be adopted. He prefers gray ointment, and uses from two scruples to one drachm daily.

The only contraindications to the method recognized by Neumann (*op. cit.*) are (1), the cases of delicate, weak, mostly blonde individuals, who are liable to severe acute attacks of eczema after inunctions, or (2) where the personal prejudice of patients in private practice has to be considered. The inunctions are to be made by the patient or by some one similarly diseased. This is a wise precaution in the presence of ulcerative secondary lesions, but is unnecessary under ordinary circumstances. A portion of salve the size of a pea is to be gently rubbed in until the skin is dry, then another portion in a similar manner is to be used on the corresponding part on the other side of the body, and so on until the requisite dose has been administered. The inunction has been well applied when there remains a gray color after wiping with a cloth, showing the salve in the pores of the skin. The average number required is thirty-five to forty, but they should be continued until all symptoms disappear. The dose is regulated according to the condition of the patient, or the effect desired, or the symptoms to be overcome.

Von Hebra (*Internat. klin. Rundschau*, October 6, 1889), McCall Anderson (*Journ. Cut. and Genito-Urin. Dis.*, November, 1889), and others might be cited, but the list is sufficiently long to show the strong hold this method of treatment has upon syphilographers, and to present its claims fairly. Modifications of the method of inunction consist in the use of *mercurial soaps* (Schuster's, Oberlander's, Spillmann's, Dietrich's, etc; see Taylor's article in Hare's *Therapeutics*), but they are far more uncertain and inaccurate than the ointment, and, as Fournier says, although they are cleaner, require even more time for their proper application than the ointment.

Mercurial plasters of various kinds have been used from time to time. Brodie's method will be considered under the head of Hereditary Syphilis (see p. 809). Chassaignac employed the emplastrum de Vigo cum Mercurio, which contains metallic mercury triturated with styrax and turpentine and added to ordinary lead plaster. Unna (Taylor, *op. cit.*) uses a mercurial plaster mull, which he strongly recommends to persons compelled to travel, or much desiring secrecy.

Quinquand (*La Semaine Médicale*, August 13, 1890) believes that a

calomel plaster offers a ready and sure method of bringing the system under the influence of mercurials. This plaster is made as follows :

R Diachylon plaster	3,000 parts
Sublimated calomel	1,000 “
Castor oil	300 “

The plaster is melted and the calomel added while suspended in the castor oil. It is spread upon linen in certain definite proportions.

Before applying it the skin should be thoroughly washed with soap and warm water. A square decimetre (sixteen square inches) of the plaster is applied to the surface and left on for eight days. It is then removed, and reapplied after an interval of eight days. Examination of the urine showed that the mercury thus applied was absorbed. By employing not more than a square decimetre there is practically no danger of salivation. By doubling the dose—that is, the size of the plaster—a slight stomatitis is sometimes excited.

3. Hypodermatic Injections.—The superiority of this method of treatment to all others has been most extravagantly and persistently set forth by its advocates during the last ten years. Their claims are based primarily upon the shortcomings of the methods of mouth ingestion and inunction, and further, upon certain alleged advantages of the hypodermatic method itself. Gastro-intestinal irritation and dermatitis are, however, the only two undesirable conditions produced by the other plans of treatment which can with any certainty be avoided by the subcutaneous method, and even these occur occasionally.

The specific claims made by the enthusiasts and extremists who have been exploiting the method are as follows (Sukhoff, Damman, Elsenberg, Lang, Balzer):

1. *The practitioner remains master of the situation throughout.* This is one of the glittering rhetorical generalities indulged in occasionally by our Continental colleagues, which may mean anything or nothing, and to which a definite reply is always difficult. In this instance, under the most limited interpretation possible, it is not warranted by the facts.

2. *The drugs needed may be easily obtained in the pure state.* This is not peculiar to the hypodermatic method.

3. *They may be prepared for use by the physician himself.* This, if ever an advantage, is scarcely worth mention.

4. *In the use of the soluble salts of mercury a precise dosage is obtainable.* It may fairly be questioned whether the varying degrees of local reaction affecting the rapidity and the thoroughness of absorption do not give rise to as much variation in the dose as do the differences in absorptive power in the skin and the gastro-intestinal mucous membrane.

5. *It saves time and labor on the part of both physician and patient,*

rendering visits more infrequent, etc. This is doubtful, and not very important if true.

6. *It necessitates but little alteration in diet, habits of life, etc.* Such alteration under ordinary methods is practically only that indicated by the general rules of hygiene, and would be beneficial to most persons, non-syphilitics included.

7. *The patient's skin and digestive organs remain unaffected except in rare instances.* This is true, but is offset by the pain, the liability to abscess, and other objections to be described later.

8. *Stomatitis is of rare occurrence.* The evidence goes to show that with equal care it is more likely to occur during hypodermatic medication, and when it does occur comes on more suddenly and is more intense and uncontrollable than under either of the other methods.

9. *It enables the patient to conceal the disease.* This may have some little force when the method is compared with the inunction treatment, but is certainly a very minor point in any event.

10. *It lessens expense.* This is likewise of little importance, as the difference is not great.

11. *It is more likely to effect an entire and permanent cure, and does so in the shortest time and with the minimum amount of mercury.* This is, after all, the most important claim that is made, and if it could be established would warrant the adoption of the method to the exclusion of all others. I am of the opinion, however, that it can not be substantiated, and at any rate am certain that the time has not yet arrived for a final and judicial decision upon the matter. The evidence is contradictory, and is open to the suspicion of bias upon both sides, but especially and notably upon that of the advocates of hypodermics.

12. *In the presence of grave and imminently threatening visceral troubles it affords the readiest and surest way of producing a powerful influence.* This may possibly be admitted, although in the great majority of cases there is ample time for the employment of inunctions.

13. *In doubtful cases it shortens the time required for the "therapeutic diagnosis."* This is scarcely to be included among advantages belonging to a system intended for routine treatment. It is especially claimed for the hypodermatic use of calomel, and will be discussed in connection with that drug.

The objections to the method may be more briefly mentioned, as I believe they are all well founded :

1. *It is painful, and in many patients excites apprehension and is strongly objected to.* It might be added that the measures advocated to obviate or lessen pain, viz., the precedent or simultaneous administration of morphia or cocaine are in themselves highly objectionable and certainly to be discouraged.

2. *It is occasionally though rarely dangerous, and sometimes rapidly fatal.*

3. *It is liable to be followed by certain local complications which are: a, erythema; b, painful nodosities; c, cellulitis; d, abscess; e, sloughing.* While the percentage of these troubles is small in the reported cases, it must be remembered that the bulk of the enormous mass of literature referring to it which has accumulated during the last decade has been contributed by partisans. This prevents me from being much influenced by figures showing, for example, that "in 36,922 injections in 3,185 patients, suppuration occurred in 116, or less than one third of one per cent" (Damman, Aust. Med. Jour., March 15, 1892).

4. *It can not be carried on by the patient, but requires the constant, even though infrequent, intervention of the surgeon.* In attempting to review the contributions to this department of syphilology I shall not attempt completeness, both because of lack of space and for the reason that so much that has been written is, if not stale and flat, certainly weary and unprofitable. I have, during the last five years, summarized much of it in the section on syphilis in the Universal Annual of the Medical Sciences, and would refer to those volumes and to Taylor's comprehensive *résumé* in his admirable essay in Hare's System of Therapeutics, to which paper I must express my great indebtedness in the preparation of this article. I shall, however, describe the details of the method and its variations, and may then express my own conclusions as to its limitations and the circumstances which indicate its employment.

The two chief subdivisions of the hypodermatic method are based upon the solubility or insolubility of the mercurial preparations which are employed, the leading member of each group being respectively the corrosive chloride and the mild chloride.

The *technique* of their introduction is practically identical in both classes. The solution or emulsion used should be sterilized. The skin of the region selected for the puncture should be cleansed with soap and water, then with alcohol or turpentine, then with a 1 to 20 carbolic solution, and finally with 1 to 1,000 sublimate solution. The hands of the operator should be similarly prepared. The needle, which should be larger and longer than the ordinary hypodermatic needle, and the syringe itself, should be washed in 1 to 20 carbolic solution for at least fifteen minutes before using.

Any form of syringe may be employed, the essentials being that it is capable of complete sterilization, works easily and smoothly, and holds the necessary quantity of fluid. For some of the preparations employed a rubber syringe and a silver or gold needle are of advantage. For many of them the ordinary hypodermatic syringe, with the larger needle, will suffice.

Much has been written about the site of the injection and its depth. There seems reason to believe (see p. 755) that the local influence of mercury is of great advantage, and the existence of a serious lesion at an accessible locality may occasionally determine the point of injection. Usually, however, the post-trochanteric region has been chosen as one which is not subject to pressure, or to the observation of others, and which is not especially sensitive. The statement has been made (Taylor, *op. cit.*) that experience shows the thighs to be particularly liable to undergo suppuration, and that they should therefore be avoided. The same advice is given as to the arms and forearms. The only *a priori* reason which occurs to me in explanation is that the constant use and motion of these parts may favor inflammatory changes. They would naturally be selected frequently under ordinary circumstances for hypodermatic medication, and the fact of their special susceptibility to abscess ought to be fully demonstrated before they are excluded from the list of available sites. The regions where the skin is closely applied to bones, those where cellular tissue is scanty, and those subjected to pressure in ordinary positions, should be carefully avoided, as should those in which suppuration or sloughing would be followed by noticeable disfigurement. As to the depth at which the injection should be deposited the choice lies between the muscular tissues and the subcutaneous connective tissue. In my judgment the preference should undoubtedly be given the latter, as, if abscess occurs, it is much more easily managed than if it is subfascial.

The method of throwing in the fluid is identical with that of giving an ordinary hypodermatic injection. A fold of skin should be pinched up and the needle introduced parallel to its long axis and to the required depth. The point of puncture should be covered with the finger of the operator as the needle is withdrawn, and then with a little iodoform in collodion.

All these precautions can not prevent occasional microbial infection from the deeper layers of the skin, and unless the fluid used happens in itself to be antiseptic this accident will be followed by cellulitis (streptococcus infection) or abscess (staphylococcus aureus or albus).

We may now consider the special substances used in the two great groups.

1. The Soluble Salts used hypodermatically.—(a) *Corrosive Sublimate*.—The subcutaneous use of sublimate in syphilis was introduced by Hunter in 1856; Hebra in 1860, and Berkeley Hill in 1866 followed; but it was the work of Lewin at the Charité, in Berlin, that brought it prominently before the profession. Since then it has been employed in thousands of cases and by many hundreds of practitioners.

The dose is from one twelfth to one quarter of a grain dissolved in about twenty drops of distilled water. It may be given in an average case

every second or third day until stomatitis is threatened, and may then be used at longer intervals. If selected on account of some emergency, larger or more frequent doses may be employed.

The special indications for its use are said to be gastro-intestinal irritation or idiosyncrasy in relation to the use of mercury by the mouth; similar conditions of the skin as to inunctions; the necessity for the use of the stomach for medication for intercurrent disease; the presence of grave syphilitic lesions resisting ordinary treatment; the existence of obstinate localized syphilomata. Its use is most successful during the secondary stage.

Various modifications of the formula have been suggested. Kratschmer and Stern added ten per cent of sodium chloride to the sublimate solution. Tchistiakoff used vaseline for the same purpose; he also recommends:

℞ Hydrarg. bichlorid. grs. x
Aeid. tartaric 3 ss.
Aquæ destillat. ʒj

The formula used in the Berlin Poliklinik is:

℞ Hydrarg. ehlor. corrosiv. gr. $\frac{1}{4}$
Sodii chlor. gr. $\frac{3}{4}$
Aquæ destillat. f ʒi

M. Sig. Inject one drachm two or three times a week.

Lukasiewicz uses a five-per-cent solution of corrosive sublimate containing five per cent of salt. He injects a syringeful (Pravatz) weekly, and prefers deep injections in the gluteal regions. In his seven hundred injections he has found the treatment harmless, and says that only in cases where acute exacerbations of syphilitic symptoms, endangering vital parts, show themselves, need the interval be shortened. Six to eight injections were generally sufficient to effect a "cure." He recommends this treatment because of its rapid removal of apparent symptoms, and on this account believes it to be of special value in cases of sudden outbreak that must be dealt with speedily. Nerve lesions, complications of different kinds, and marked adenitis are, according to his views, special indications for this method of treatment, and he thinks such cases are especially benefited by it. Finger advocates in hypodermatic medication a one-per-cent corrosive sublimate solution having twenty per cent of common salt. Eichler has used this salt "with great success" in the early treatment of syphilis. He prefers small, frequently repeated doses, using one twelfth of a grain in injection daily for twelve days, then giving a rest of twelve days, then a second series of injections, followed by a pause, and then a third. He has found this series of thirty-six injections so far "sufficient to hold the disease in check." He has only once had abscess follow injection. The freedom from this complication he attributes to his strict asepsis, and to the use of a long, fine needle which injects the solution deeply into the tissues. The seat of injection is with him preferably in the back between the shoulder-blades. The solution which he uses is as follows:

℞ Hydrarg. chlor. corrosiv. gr. j
Glycerini,
Aquæ āā f ʒj

M. S. Injeet ten minims containing one twelfth grain daily.

Behrmann believes that aqueous solutions of the bichloride should be preferred to all other mercurial preparations employed in the therapeutics of syphilis, that hypodermatic injections of the solution are tolerated better than all other soluble or insoluble compounds; that the injections do not give rise to local abscesses; that stomatitis occurs but seldom, certainly more rarely than in the treatment by inunctions; that relapses occur less frequently, and have comparatively milder symptoms. These represent the most extreme views regarding this salt.

The use of sublimate mixed with oil is a form for which much is claimed in hypodermatic medication with this salt. The emulsions are prepared, according to Cruyl and Burlureaux, by dissolving the sublimate in ether; this requires about five volumes of ether to one of bichloride. This is then added to the oil, and the ether driven off by the application of heat. The proportion should be one per cent of sublimate in the oil. According to Cruyl, the fluid should remain clear, and can be filtered to remove any particles. He used one syringeful daily (Pravatz), ten or twelve injections being sufficient. Burlureaux used a mixture containing one centigramme of corrosive sublimate in twenty-five grammes ($\frac{1}{3}$ grain in 3 v Div). He has seen no bad effects; there was diarrhoea, but without colic, and stomatitis and salivation were absent. The dose used was one centigramme. Zeleneff, of Kiev, published a report of one hundred and four cases of syphilis treated by him with corrosive sublimate. The mercuric bichloride is first mixed with vaseline, then oil of vaseline is added in sufficient quantity to make an emulsion containing twenty-two per cent of corrosive sublimate. The injection preparation contains from a half to two grains (0.032 to 0.13 gramme) of the sublimate. In some cases an emulsion of the bichloride (36 grains = 2.33 grammes) in oil of vaseline (1 ounce = 37 grammes) was employed, the dose being one grain (0.065 gramme) of the sublimate. In either case the emulsion was warmed in hot water and then thoroughly shaken just before using. In the case of half-grain (0.032 gramme) doses, the injections were repeated once every four days; in that of one-grain (0.065 gramme) doses, every six days; and in that of two-grain (0.13 gramme) doses, every ten days. In all, nine hundred and fifteen injections were made, thirty-one patients being treated with half-grain doses, thirty-three with one-grain doses, and forty with two-grain doses.

The following are his principal deductions from the clinical inquiry: 1. In the case of two-grain injections, all syphilitic manifestations disappeared on an average after five or six *séances*; in that of one-grain injections, after eight or nine; and in that of one-half-grain injections, after twelve or fourteen. 2. The local reaction was trifling. 3. The bodily weight fell in thirty-nine out of seventy-four patients examined, while in thirty-five it increased during the course. 4. As to the bodily temperature, in forty per cent of cases the first injection of the sublimate "suspension" was followed by a rise. Subsequent injections did not make any impression on the temperature. 5. Of toxic phenomena were observed gingivitis, abdominal pain, and diarrhoea, with blood-stained stools. 6. Distinct traces of the metal appeared in the urine in about twelve hours after the first injection; after each subsequent dose the proportion of mercury markedly increased for from one to three days.

(b) *Asparagin-Mercury*.—Neumann used this drug in thirty-seven cases. Two and a half drachms of asparagin is dissolved in warm water,

and oxide of mercury added to saturation. The solution is filtered after cooling, and the amount of mercury estimated. It is then diluted to make a one or two per cent solution of mercury as required. Unlike the solution that Wolff used more than ten years ago, it contains no excess of asparagin.

The daily injections were made under strict aseptic precautions in the interscapular region, one cubic centimetre (*circa* ⅓ xv) of the one-per-cent solution, containing one sixth grain (0·01 gramine) of mercury being used in each injection. Only once was there any induration at the site of the injection. Stomatitis was observed once, as was blood in the stools. In one case a macular syphilide appeared during the treatment. The unpleasant symptoms noted disappeared after the omission of the drug for a short period. The injections were otherwise well borne, and the patients gained considerably in weight.

Of the thirty-seven cases, thirty had various syphilides and four had condylomata. One only belonged to the tertiary period. Two cases with initial lesions only were treated prophylactically, and in one case a syphilide appeared. The eruptions faded in about two weeks, and disappeared in from three to four weeks. The average number of injections was 36·5, and the average duration of the treatment fifty days. Three cases only relapsed. The especial advantage claimed for this preparation is the rapidity with which it enters the circulation and affects the syphilitic process, and the speed with which it is eliminated.

(c) Another of the more recent preparations is the *succinimide of mercury*, which has been before mentioned as used by Jullien in medication by the mouth. In hypodermatic medication this author recommends and has used it in a five-per-cent aqueous solution, in doses of one sixtieth to one twentieth of a grain. He had no bad effects.

The chief danger to be guarded against is the impurity of the drug. It rarely causes gingivitis. It sometimes produces a diarrhoea which is controlled by the stoppage of the medicine. Its hypodermatic use dispels symptoms much more rapidly than the internal use. It can be employed advantageously in all cases where the patient will allow it, and is especially recommended in cases complicated by kidney disease.

(d) The *oxycyanide* has been used by Boer in one gramine (gr. xv) injections containing 1·25 per cent of the mercurial. He claims for it the advantages over bichloride of not coagulating albumen; it is neutral or of alkaline reaction; it is less poisonous and caustic; its solutions are stable; it does not injure the surgical instruments so quickly.

(e) *Mercuric Albuminate* (Bamberger).—An unstable compound of white of egg, sodium chloride, and sublimite, of indefinite composition and liable to rapid deterioration, and (f) *Mercuric Peptonate* (Martineau), a mixture with similar defects, had a short period of popularity, but soon fell into disuse. Allied preparations, such as the “blood-serum mercury” (Bochhart), and the “hydrochloric gluten-peptone sublimite” (Hufner), are, as Taylor says, “polypharmaceutic refinements and therapeutic curiosities.”

"Staub's fluid" and Gaillard's mixture, with a base of biniodide of mercury and sodium phosphate, may be included in the same category (see a review of Hypodermatic Medication for Syphilis, by Raymond, *Gaz. des Hôpitaux*, July 9, 1892).

There are various other salts that have been used and are now superseded by those mentioned, either because their solutions were unstable, as the peptone, or because of the pain or other serious symptoms which their use in hypodermic medication produced.

(g) *The Iodo-Tannate of Mercury* (Nouny) may be used in the following formula:

R	Hydrargyri	.	.	.	.	.	.	.	.	gr. $\frac{1}{16}$.
	Iodini	.	.	.	.	.	.	.	.	gr. $\frac{1}{4}$.
	Acid. tannic	.	.	.	.	.	.	.	.	gr. $\frac{3}{16}$.
	Glycerini	.	.	.	.	.	.	.	.	gtt. xv. M.

(h) *Carbolate of Mercury* (see p. 751) has been used in doses of one sixth to one third grain, dissolved in fifteen drops of water, by various experimenters (Lexer's *Archiv. für Derm. und Syph.*, 1889, p. 715).

Studies of the comparative effects of inunctions, and of this and other mercurial salts administered hypodermatically, showed the following proportion of relapses: Inunctions, nine per cent; sublimate, thirteen; salicylate, fifteen; formamide, peptonate, and gray oil, sixteen; tannate, eighteen; carbolate, twenty-seven. I have but little faith in these or similar figures, but this would seem to show that the advantages anticipated by Gamberini (who introduced the carbolate) (*Giornale del. Mal. Ven. e del. Pelle*, 1886, p. 241) from the combination of two germicides have not been realized.

(i) *The Formamide of Mercury*, in the daily dose of a Pravaz syringe-ful of a one-per-cent solution, was introduced by Liebreich and has been very extensively employed. Contradictory results have, of course, been reported, but the evidence goes to show that it is one of the most painful of the preparations used, and is not very stable.

(j) *Alaninate of Mercury*, introduced by De Lucca, was said by him to be preferable to all other soluble mercurials for hypodermatic use by reason of the smallness of the dose and the rapidity and permanency of its action, but these assertions have not been confirmed by later investigators.

(k) *The Benzoate of Mercury* is preferred by Balzer and Thiroloix (*La Méd. Moderne*, p. 47, Paris, January 9, 1890), who say that this salt coagulates albumen far less than other combinations of mercury, and hence exercises a less energetic action upon the cutaneous nerve filaments. In their hands it did not seem to cause gastro-intestinal complications or abscesses, and no cases of gingivitis ever went on to marked salivation. The objections to it are that many injections are required, that it deteriorates on keeping, and that it sometimes causes induration at the point of application.

Cochery also (Thèse de Paris, 1890) says that the fact that the benzoate does not coagulate albumen is the explanation of its comparative painlessness. He found that this, like other preparations, is not well borne by very stout persons, the presence in connective-tissue spaces of masses of fat presenting the satisfactory diffusion of the remedy. The same observation has been made by others. Brousse (of Montpellier) prefers this salt to all the other soluble preparations.

Cochery's formula is that of Stoukownikoff. It is given in a mixture containing sodium chloride and eocaine.

II. The Insoluble Salts used Hypodermatically.—(a) *Calomel*, which may be taken as the type of the insoluble preparations, may be used in the dose of one half to one grain every four days, two grains weekly, or three grains every ten or twelve days. It may be given in one of the following mixtures:

℞ Hydrarg. chlorid. mit.	. . . . .	gr. ss.
Glycerinæ purificat.	. . . . .	gtt. x
Aquæ destillat.	. . . . .	gtt. x M.
℞ Hydrarg. ehlorid. mit.	. . . . .	gr. j
Mueilag. acaeiae	. . . . .	gtt. xx M.
℞ Hydrarg. ehlorid. mit.		
Sodii chloridi	. . . . .	āā gr. j
Aquæ destillat.	. . . . .	gtt. xxx M.

The calomel used should be sublimated by steam and perfectly sterile.

The method in use by Besnier at the Hôpital Saint Louis may be given in detail. The formula used is calomel one part, oil of vaseline twenty parts. The calomel is incorporated with the petro-vaseline and well shaken, to put the insoluble substance in as perfect suspension as possible, and the mixture is then boiled a few seconds before making the injection in order to sterilize it. The operator should wash the hands in a mixture of alcohol and liquor of Van Swieten, and cleanse the part where the injection is to be made with some absorbent cotton wet with the same solution. The needle of the syringe should be similarly cleansed. The choice of location for making the injection is a point of the buttocks about three centimetres below the crest of the ilium, and an equal distance above and to the inner side of the great trochanter. The skin is displaced somewhat, so that there is no direct continuation of the puncture of the integument and that of the deeper tissues. The insertion of the needle is done quickly at one stroke down to the guard. The injection is then made gently, but some force must be employed to secure a passage of the emulsion into the tissues.

The employment of calomel subcutaneously was originally advocated by Scarenzio in 1864, but was not very extensively used except in Italy and Germany until the writings of Smirnoff, in 1883 and 1886, called renewed attention to it. During the interval Sigmund was the most promi-

nent syphilographer who carefully investigated the claims which were made for it, reaching the conclusion that we can not hope to "cure" syphilis by a few injections of this or any other salt of mercury. Since then it has been used very largely, and its limits of usefulness, as well as its dangers, are now fairly well understood.

We may consider the latter first.

Locally, there is almost always pain of greater or less severity. This is denied by some of the advocates of the method, but I am convinced that not less than ninety per cent of the patients who have undergone this treatment would testify to the contrary. I have not used it very extensively, but I have yet to see the first case in which marked pain was not excited by the injection, sometimes subsiding soon after, but oftener increasing and lasting for hours or even days. I have never used morphia or cocaine at the same time, and think the practice very objectionable.

There is almost always an inflammatory reaction which, when slightly developed, causes merely a flush around the needle puncture, and a feeling of heat or itching. Lesser has reported a case of extensive mercurial erythema. Oftener there is an exudation of lymph with the formation of a hard, horny nodule, moderately tender to the touch, and very painful if subjected to continuous pressure. This is usually absorbed if asepsis has been good, but in a certain proportion of cases goes on to softening, to suppuration, and the formation of an abscess. It rarely or never disappears under two weeks, often persists for a longer time, as has been shown by Balzer at autopsies, and its disintegration is sometimes attended with extensive sloughing and cellulitis.

Constitutionally, calomel injections have produced the following unfavorable results: Stomatitis, in spite of the assertions to the contrary, has not been infrequent, is often very persistent, and is sometimes of a very grave variety attended with all the more dangerous phenomena of ptyalism (see p. 742). It is the more serious as it comes on suddenly (fulminating type), and is very rebellious to ordinary treatment. This intractability is probably due to the continuous absorption going on from the point of deposit of the drug, and has in more than one instance necessitated the excision of the indurated tissue thereabouts (Vogler has reported three such cases), and the cauterization of the walls of the resulting wound. Gastroenteritis and colitis have occurred (Besnier), and have even been fatal (Kraus), and two cases of pneumonia following a calomel and oil injection have been reported (Klotz), and were presumably due to oil embolism.

On the other hand, the influence of the drug thus used upon the symptoms of syphilis in the secondary stage, and its occasional value as an adjuvant to the iodides in the treatment of later phenomena when grave or dangerous, have been abundantly demonstrated. The most striking re-

sults have been obtained in specific eye troubles, but various forms of connective-tissue lesions have been reported as rapidly cured by its use.

There can be no reason to doubt its efficacy (if properly administered) during the secondary stage of syphilis. Mercurialization, however produced, is then at its acme of usefulness. There is much more reason to question the reported benefits in all forms of tertiary syphilis. It is contrary to the accumulated experience of the profession to find in late syphilis, gummata, periosteal nodes, osteitis, tubercular syphilides and other phenomena of similar character yielding promptly to the use of mercury alone. It is of undoubted value then as an adjuvant to or in conjunction with the iodides, but on both theoretical and clinical grounds can not be expected to supersede them.

Smirnoff's reported cases require confirmation. Taylor acutely says: "Smirnoff significantly remarks that if, during a course of injections in tertiary syphilis, aggravation of the symptoms occurs, they should be stopped at once, and the iodide of potassium should be substituted."

One possible advantage of calomel may be properly mentioned here. Jullien (*Le Bulletin Médical*, June 19, 1892) calls attention to its diagnostic value in doubtful surgical cases. He says:

"The propriety of operating in certain cases is, in the experience of every surgeon, counteracted by uncertainties of diagnosis: an ulceration, a tumor of ambiguous identity, makes one suspect cancer, without casting aside all waverings toward the side of syphilis. The surgeon should, in such a case, institute a course of treatment to throw light as rapidly as possible on the obscure points." Under these conditions, Jullien says he can not too vehemently proclaim the superiority of calomel injections according to the Scarenzio-Smirnoff method: one twelfth grain (0.097 gramme) of calomel suspended in fifteen grains (0.97 gramme) of liquid vaseline, thoroughly sterilized, and injected once into the gluteal muscles under aseptic conditions. He says that no one can deny the profound influence which it exercises upon a syphilitic neoplasm, no matter what has been its duration. In five cases which he cites he determined whether a tumor was a manifestation of syphilis or not—i. e., whether or not operation was indicated. He adds, "Calomel by injection presents in the highest degree the qualifications of a test-medicine." He thinks that no argument can be brought up in opposition, and that, if the surgeon does not utilize this method, "it is not—it can not be—that he condemns it, but that he is ignorant of it." It may be discarded in the methodic, prolonged treatment of syphilis, but all its inconveniences are obliterated by two indubitable facts, in the presence of doubts concerning a malignant degeneration where "delays are dangerous." These two facts are: "1. That a therapeutic diagnosis of syphilis is clearly defined in eight days by injection of calomel. 2. In case of negative results, this treatment has not impeded the necessary operation in the slightest degree, and does not in the least complicate its results." However, even Jullien says that it must not be used blindly, and that it is best not to employ it in cases of marked albuminuria. If further experience confirms these observations, it will be one of the best practical results following the excessive (and

unnecessary) use of hypodermatic treatment which has been the fashion for some years on certain parts of the continent.

(b) *Metallic Mercury* has been used by a number of observers with the usual claims of little pain, certainty of results, absence of relapse, etc. The dose employed has been from five to twenty or thirty grains once weekly, followed by kneading and rubbing of the region. Von During and Angagneur have each reported a case in which a tumor formed and was persistent, and the former had in one patient such severe toxic symptoms as to necessitate excision of the nodule at the point of injection.

(c) *Gray Oil (oleum cinereum)* is a form of metallic mercury which has been much more widely used. It was introduced seven years ago by Lang, of Vienna. It is prepared by making an ointment or pomade of mercury with lanoline as a basis and then diluting this with almond or olive oil (Lang); or by triturating metallic mercury with ethereal tincture of benzoin and oil of vaseline (Neisser), or by combining with the mercury and lanoline a two-per-cent carbolyzed olive oil (Althaus).

However prepared, the aim is identical—i. e., to secure a minute subdivision of the metal, and to obtain complete fluidity. The reported results are again contradictory.

Lang warmly commends the method in a paper based on his experience for four years. Balzer and Reblaub (*Gaz. des Hôp.*, July 9, 1882) used the formula of Neisser (of Breslau), accord to it some advantages, and compare it with the yellow oxide (q. v.). But Hallopeau, Lindstrom, and Kaposi have noted alarming cases of mercurial poisoning which Lang attributes, however, to the improper use of the oil. Matrasewski has shown experimentally that subcutaneous injections of oil may give rise to fatty embolism (a case of Klotz's has already been mentioned, see p. 768), and Lesser reports another case evidently of pulmonary embolism from the use of an emulsion of tannate of mercury in olive oil.

(d) *The Yellow Oxide of Mercury*.—Taylor says that this salt is to-day the most generally used hypodermatically of all the mercurial compounds, having largely replaced calomel. The evidence as to their comparative value is not so conflicting as usual.

Hebra, in 1889, recommended it as the best of all the insoluble preparations. Huot (*Injections Mercurielles massives*, Thèse de Montpellier, 1892) has compared calomel and yellow oxide, and thinks that while the calomel is the more active it is also the more irritating; Kuhn (*Deut. med. Woch.*, 1888, p. 635) made the same comparison with the same result; Besnier gives similar testimony; Du Castel, who tried in a number of instances, in the same patients and at the same time, calomel and yellow oxide injected in corresponding parts of the body, says that the former is more irritating, but that he believes they are equally valuable as curative agents. Le Roy agrees with this latter observer. Sibilat says (*Gaz. des Hôpitaux*, July, 1892) that six injections of the yellow oxide correspond to four of calomel. The drug was introduced by Matrasewski,

who gave up calomel on account of the pain and other unpleasant symptoms which it produces. His formula is:

R Hydrarg. oxid. flav.	.	.	.	.	.	.	.	gr. xv
Acaciæ	.	.	.	.	.	.	.	gr. iv
Aq. destillat.	.	.	.	.	.	.	.	f ʒ i M.

He uses a Pravaz syringe, and says that three to six injections suffice for a "cure," which, Taylor says, "it must always be remembered, means in the minds of most exploiters of hypodermatic mercurial preparations in syphilis the disappearance of a given set of symptoms or lesions." The following remarks of Taylor throw such a strong side light on this whole question of the hypodermatic treatment of syphilis that I quote them fully: "Tchernoguboff uses this preparation in doses of two grains every ten or eleven days, injected into the muscles. He says that syphilitic children from twelve to fourteen years old tolerate one-grain doses hypodermically very well, and are benefited. He thus treated one hundred and twenty cases, male and female, young and old, without any untoward complications. It is interesting to remember that Lesser observed abdominal pains, vomiting, and bloody, and mucoid diarrhoea after injections of yellow oxide, and never after calomel. The conclusion therefore is warranted that we can only get at the truth as regards the advantages and drawbacks peculiar to any and all preparations by a study of the experience of many men. It is never well to rely fully upon the assertions of the exploiter of a new mercurial preparation or combination. Thus we find that Dampenkoff used the yellow oxide upon one hundred and seventy-nine syphilitic women, and that 'neither intense pain nor suppuration was produced.' Yet these women absolutely refused to allow the continuation of the treatment by reason of the severity of the pain. Then, on the other hand, Reshetnikoff, in the course of eighteen hundred injections of yellow oxide suspended in vaseline oil made into the gluteal regions, never met with an instance of local suppuration, and only once saw a diffuse sanguinolent infiltration, which disappeared without any bad result."

Kaposi has reported a fatal case with stomatitis, diarrhoea, and albuminuria.

(e) *The Neutral Salicylate of Mercury* was first introduced into the therapeutics of syphilis by Silva de Araujo (see p. 751). Szadek first employed it in hypodermatic injections, using it in the following formula:

R Hydrarg. salicylat.	.	.	.	.	.	.	.	gr. ii j
Mucilag. gummi arabici	.	.	.	.	.	.	.	ʒ v
Aquæ destil.	.	.	.	.	.	.	.	f ʒ ij M.

He gave the injections at intervals of two or three days, affirming that they produced very little local manifestation. This is confirmed by many other writers.

Szadek, in his further investigation, has used both a five-per-cent and a seven-per-cent suspension in gum acacia, and found it of especial use in the secondary stage and in the relapses of that period, eight to twelve injections during a period of twenty to forty days' sufficing. Legius reports twenty-five cases with one hundred and twenty-six injections of this salt, using a ten-per-cent suspen-

sion in liquid vaseline; the dose was one grain and a half (0.10 grammes), given weekly. The local reaction was slight. There was no abscess. Eich, in the hypodermatic use of the salicylate, found the average duration of treatment in his cases to be twenty-seven days. The average dose was one grain and a half twice a week, and the average number of injections required was seven. In thirty per cent of his cases there were recurrent symptoms, coming on early and of severe character.

Neumann used this salt in eleven cases, and saw no local irritation. He employs a ten-per-cent suspension in paraffin, and injects every fourth day one (Pravaz) syringeful. Leichtenstein is convinced of the occasional prompt, searching, and energetic effect of the salicylate, but also says that in a relatively large number of cases it wholly fails, and is far surpassed by oleum cinereum. Petersen used the salicylate in fifty-four cases with one hundred and seventy-six injections, one and a half grain, weekly. Stuffer reports four hundred and thirty-five cases, in which the salicylate and thymol acetate were well borne.

(f) *Thymolacetate of Mercury* has been used considerably by hypodermatic injection. Its inventor, Weland, uses one grain and a half to fifteen of liquid paraffin at four-day intervals, and asserts that it requires about six injections to abolish symptoms.

Migneco says of this salt that its use in eighteen cases gave better results than those obtained from bichloride, the effect being more rapid and the sequelæ returning less quickly. He used intramuscular injections, one Pravaz syringeful of a seven-per-cent solution, made up as follows:

R Hydrarg. thymol-acetat.	.	.	.	.	.	.	gr. xxijss.
Mucilag. gummi arabici .	.	.	.	.	.	.	gr. vijss.
Aquæ destil. .	.	.	.	.	.	.	f. 3 v

Löwenthal used intramuscular injections of—

Hydrarg. thymol-acet.	.	.	.	.	.	.	gr. xv
Glycerinæ .	.	.	.	.	.	.	3 ijss.
Cocain. muriat.	.	.	.	.	.	.	gr. jss.

One Pravaz syringeful was the weekly dose. There was no pain or abscess formation, or even infiltration. In one case, in which there were decayed teeth, he produced salivation, and twice he observed a chill after the injection.

All symptoms disappeared after ten to twelve injections, and relapses were not of frequent occurrence. There were no digestive symptoms in the sixty patients whom he treated with two hundred and ninety-three injections. Szadek has also used a seven-per-cent mixture in eighteen cases and found it useful.

(g) *The Black Oxide, Protiodide, Red Oxide, Tannate, Sulphate, Turpeth Mineral, and Cinnabar* have all been used, and without exception the original experimenter has in each case found advantages possessed by no other preparation.

This does not begin to complete the formidable list of therapeutic suggestions that have been made, and, unfortunately for the patient, acted upon during the last few years. It will suffice, however, to eluci-

date the present state of the question, and make a basis for a reply to the following important queries :

1. Does hypodermatic medication in syphilis offer advantages which justify its adoption as a systematic method of treatment ?

2. Under what circumstances, or in what classes of cases, should it be employed ?

3. What are the indications for the selection of soluble or of insoluble salts ?

4. What are the particular drugs which are to be preferred ?

1. Even if it be contended that the question of the routine employment of hypodermatic medication in preference to other methods is still *sub judice*, it seems to me that there is little doubt that the evidence at present is overwhelmingly against it.

The positive objections to it I have already sufficiently considered. Marked pain, sensitive nodosities, cellulitis, sloughing and abscess, liability to disfiguring and permanent cicatrices, to a sudden and grave type of stomatitis, to violent entero-colitis, to pseudo-paralyses, albuminuria, pulmonary embolism, etc., even if they occur in but a small percentage of cases, make up a sufficiently formidable list of possible accidents to warrant a reasonable hesitation before giving up older and well-tried methods, practically free from danger, in favor of this one.

The objections to it by the patients themselves are a serious obstacle, in this country at least, to the practical success of the method. Even our hospital and dispensary cases constitute a much more independent class than the same sort of people abroad, and can not be subjected to wholesale experimentation with the same impunity. In Paris, Fournier has called attention to the fact that syphilitics flocked from the hospitals where this method was being tried to his service. In private practice here it is certainly difficult of adoption, and while it might be attended by the rapid disappearance of symptoms, there would often be an equally rapid disappearance of patients. My own patients have, without exception, objected strongly to both the bichloride and the calomel injections, the only two I have tried.

The figures which are gradually accumulating tend already to show that its employment according to current formulas brings with it another danger, viz., that involved in the encouragement of insufficient treatment, in the dependence upon the short and heroic courses which, as Hutchinson says, are often followed by the gravest and most serious tertiary phenomena (see p. 738).

The claim that by a few injections the time of treatment can be measured in months, or even in weeks, instead of in years, would seem, as Mauriac has said, to involve the idea that mercury given hypodermatically acquires some new and powerful curative property which, given in

other ways, it does not possess. As a matter of fact, when we inject the insoluble salts we are merely leaving the chemistry of their transformation into the soluble compounds to the tissues themselves; when we inject the latter, we are simply reaching the general circulation by a somewhat more direct method than when we approach it through the capillaries and absorbents of the skin or the gastrointestinal tract.

I believe that, on the whole, while the final outcome of the experiences of the last few years will doubtless be for the advantage of science and the extension of our therapeutic methods, the information thus acquired will be at the expense of many patients who will suffer from the direct consequences of the method itself, or succumb to the ultimate developments of insufficiently treated syphilis.

The opinions of a few leading syphilographers, expressed within the last five or six years, will show that, to say the least, the method is still on trial.

Kaposi (*Internat. klin. Rundschau*, Vienna, April 17, 1892) says that only where inunctions are impracticable should injections be used. He had previously (*Wiener med. Presse*, June 8, 1890) stated his belief that "in both efficiency and safety the employment of subcutaneous mercurial injections must be placed below inunctions," so that his later opinion was evidently not reached hastily.

Neumann (*Die Therapie an den Wiener Kliniken*, Landesmann, 1891), after a careful discussion of hypodermatic medication in the treatment of syphilis, states that, from an experience upon about five hundred patients in his clinical practice and a large number of private patients, hypodermatic injections should be tried when the inunction treatment has failed. Injections with neither the soluble nor insoluble compounds of mercury prevent the recurrence of syphilitic symptoms. When used as a preventive treatment they are simply able to retard for some weeks the constitutional symptoms, with the exception of the ganglionic enlargement, which is never prevented. They are not particularly efficacious in grave forms of syphilis, particularly brain manifestations of the disease. Retinitis and iritis are not materially benefited; inunctions have frequently to be substituted for injections when these complications appear.

Neisser (*Deutsche med. Woch.*, January 3 and 10, 1884) says, "I regard inunctions as the best means of obtaining the antisyphilitic effects of mercury."

Kreis (*Med. Correspondenzblatt des Würt. ärzt. Landesverein*, March, 1891) reviewed the whole subject, and recommended inunctions as giving the best therapeutic effect with the fewest accompanying disturbances, citing Von Zeissl, Von Sigmund, Lang, Leloir, Kaposi, and Neumann, as supporters of this view. He adds that "they have effected cures when the hypodermatic injections have failed," and says further that the latter, "in view of the uncertainty of their action, are not to be recommended."

In Paris, Besnier, after giving the method a full trial at the St. Louis, abandoned it. He says that all the facts point to the recurrence of syphilitic symptoms after the alleged "cure," and cites cases of his own, in one of which a patient in the height of his secondary stage, and only twenty-six days after the last five injections of calomel, had a specific meningitis which only yielded to

drachm doses of potassium iodide (Journ. of Cut. and Genito-Urin. Dis., vol. v, 1887, p. 443).

Fournier (*ibid.*, p. 349), about five years ago, was asked his opinion by Dr. Morrow, of New York. He answered: "My opinion is, it is not a good treatment. The injections are painful, they interfere with the patient's avocation, they necessitate frequently repeated visits. Above all, the method is not practicable. In private practice patients will not tolerate it. In hospital practice it is possible, but note the result: patients leave the Du Midi and Lourcine, where this treatment is employed, and flock to the St. Louis, where they know they will not receive it."

The same writer says, two years later (Journ. of Cut. and Genito-Urin. Dis., December, 1889): "Fournier is not a partisan of the method of subcutaneous injection, either of soluble or insoluble preparations of mercury. He relies upon the digestive and the epidermic routes for the introduction of the drug, giving the former the preference in the great majority of cases."

Still later (Rev. Gén. de Clin. et de Therap., 1889, p. 17), Fournier said, "As far as possible we should spare our patients the inconveniences of these injections, which can not take the place of other methods in the routine treatment of syphilis."

Brocq, after a critical review of the situation, arrives at the same conclusion (Gaz. Hebd. de Méd., 1887, p. 315). Hallopeau considers the method dangerous, and its alleged precision illusory (Bull. Méd., 1888, p. 1113). Diday (*ibid.*, 1888), under the fanciful title, "A black point in the gray oil," adds his testimony as to the dislike of patients for this treatment.

Mauriac (Journ. of Cut. and Genito-Urin. Dis., vol. v, 1887) says that the curative effects of the injections of calomel are not superior to those obtained by the internal administration of the salts of mercury. He adds: "I have not found, up to the present time, any advantage in this method, and it presents, if not dangers of a serious nature, at least quite sufficient inconveniences to prevent me from adopting it; it does not at all prevent recurrences. The general and vague assertions that we have no recurrences after the subcutaneous injections, or that we have less than with other methods, are disproved by facts. I maintain that they are quite as frequent. At least this has been my experience in the trials I have made."

Vidal (*ibid.*) has seen patients submitted to this treatment return after a brief delay with most characteristic symptoms of syphilis.

In England, Hutchinson, who is *facile princeps* the leader of British syphilographers (and who in my opinion is, with the possible exception of Fournier, the leading syphilographer of the world), says, "Hypodermic injection has come but little into employment in English practice, nor does it appear to increase in favor with those Continental surgeons who at one time thought highest of it."

In this country Taylor, so far as I know, voices the prevailing sentiment among specialists in this branch when he says: "The extent of the literature of hypodermic injections in syphilis contributed within the past ten or twelve years is simply appalling, and there is really very little which is of practical value. It will be seen that almost every preparation of mercury has been experimented with in the hypodermic-injection treatment, and that the chemist's art has been sorely taxed to produce new preparations. Each new preparation has been exploited as the ideal of perfection, and in most cases a hearty wel-

come has been accorded it, so that a witty German reviewer has made the following paraphrase of an old maxim applicable to the subject: '*De novis nil nisi bonum.*'"

As to the injection of insoluble preparations he says he has no leaning toward its employment, and that he is firmly convinced that it will never be used as a systematic treatment extending over a period of years. He adds: "It is a treatment which is generally irksome and repulsive to patients, always attended with more or less discomfort and pain, and often producing destructive subcutaneous lesions over the body, which cause mental and physical suffering, and which of necessity must impair the patient's health and strength. In some cases, we have seen, it has been known to imperil and to destroy life."

In a more recent communication to the writer Dr. Taylor reiterates his preference for the bichloride as the best preparation for hypodermatic use, and states his belief, in which I cordially agree, that it is a method of "utility, exigency, and emergency." In the presence of intercurrent disease, as of influenza, he has found it most valuable, and has occasionally used it for long periods. He adds: "No importance should be attached to claims of speedy cure. They show that their sponsor knows little about the natural history of syphilis. The disease is chronic and far-reaching, and requires a corresponding treatment. Many men who have ransacked drug stores and importuned chemists for some ideal preparation of mercury, having got one to their notion, have used it for a short time, and seeing the prompt disappearance of existing lesions (which condition could be induced by the bichloride, bichyanide, and salicylate of mercury), have rushed into print and claimed marvelous and rapid cures. A thoughtful and experienced student of syphilis will only claim cures when the patient has undergone careful, watchful treatment for two years and more, and when, from the course of the case, he is satisfied that the disease has been brought to an end."

The soluble preparations he uses, as do most of us, under varying limitations, which will be presently discussed.

A review of the present position of the method in the hands of the American syphilographers shows a remarkable unanimity in the belief that hypodermatic medication is not destined to take the place of the other methods in the routine treatment of syphilis. The subjoined extracts from letters to the writer from the members of the American Association of Andrology and Syphilology, and from some well-known dermatologists, can not fail to be of interest at a time when the advocates of the method are rather trying to force it upon the profession. I have arranged them alphabetically:

Dr. L. B. Bangs says: "I instituted some experiments a few years ago in private practice and in my service at Charity Hospital, which satisfied me that the hypodermatic method of treating syphilis was so rarely useful as to be valueless. Moreover, the claim that it 'cures syphilis in a much shorter period, etc.,' will not hold, for, in my opinion, it takes just about so long to 'cure' the disease, whatever may be the method of treatment employed.

"The effect of hydrargyrum upon a symptom can be obtained by the other methods with no pain and with less risk than by the hypodermatic method."

Dr. W. T. Belfield, of Chicago, says: "I gave up the hypodermic medication

of syphilis some time ago, because unable to convince myself of its advantages over less painful and more convenient methods of administration."

Dr. Charles F. Bevan, of Baltimore, says : "Regarding the hypodermic use of mercury in the routine treatment of syphilis my experience is not very satisfactory. The strong tendency to local annoyances, and the severe pain often experienced, are decided objections. I am inclined to believe the physiological effects of the drug may be produced somewhat more *quickly* than by oral ingestion, but are not more lasting. The absolutely curative effect by the hypodermic method in my hands has not been equal to that from other methods. It is a mode of treatment that should be reserved for some special and exceptional cases."

Dr. George Emerson Brewer, of New York, says : "My experience in the treatment of syphilis by the hypodermatic administration of mercurials has been extremely limited, owing to theoretical objections and a failure to discover any advantage whatever in the cases in which it was employed.

"My theoretical objection is that the daily dose which the patient receives is dependent upon the amount of absorption which takes place rather than upon the careful adjustment of the dose to each individual case."

Dr. F. Tilden Brown, of New York, says : "I have had no personal experience with the hypodermatic injection of mercury in the treatment of syphilis.

"I have waited for better assurances of its advantages, or positive assurances of its being a fair substitute, before making tests myself."

Dr. E. C. Burnett, of St. Louis, says : "Ever since the revival of Scarenzio's hypodermic use of calomel in the treatment of syphilis I have studied the reports from the advocates of this method, and I have been unable to convince myself that the results justify the use of it as a systematic mode of treatment of syphilis. Understanding that the employment of this method by its originator and those who came immediately afterward was first suggested by those severer cases in which the cutaneous application of mercury was contraindicated and the ingestion by the stomach unsatisfactory, I have always held this as a last resort to be used only under such conditions. During ten years of experience, both clinical and private, I have not as yet failed to relieve my patients, no matter how severe the phases of the disease, by the judicious management of the regular methods and with a minimum amount of discomfort to them.

"Aside from its possible utility under the conditions above mentioned, I can see no well-grounded reason for the employment of this method in the systematic treatment of syphilis. I believe such a use of it to be entirely unnecessary. I also believe that the claim that it cures the disease in a shorter time is unfounded, for why should the manner of the introduction of mercury into the system have an effect upon its ultimate therapeutic action when its physiological and pathological actions are known to remain the same ?"

Dr. Charles McBurney, of New York, says : "I have been always well satisfied to administer mercurials by the mouth and by inunction. In my opinion, the danger of causing even serious disturbance in the connective tissue by injection is considerable, and I have known very disagreeable results to follow the application of this method. I can not believe that it has any advantage which can balance the dangers—if it has any advantages at all."

Dr. A. T. Cabot, of Boston, says : "I can not give you any personal experience on the subject, as I have never used mercurials in that way, having always depended upon inunctions and the administration by the mouth."

Dr. George Chismore, of San Francisco, expresses the same opinion.

Dr. P. S. Conner, of Cincinnati, says : "I have seen no results following injections in any respect superior to those following ordinary internal use of the iodides and mercurials, and have been so little pleased with the method that I do not employ it."

Dr. L. A. Duhring, of Philadelphia, says : "There seems to be but little to commend the practice, and a good deal, viewed from a practical standpoint, against its adoption as a mode of treatment for the average cases of this disease.

"I therefore would express myself as much preferring the methods by the mouth and by inunction."

Dr. J. A. Fordyce, of New York, says : "Some years ago, at Hot Springs, I instituted a comparison between the treatment of syphilis by hypodermatic injections and inunctions, and was so strongly convinced of the superiority of the latter method that I ceased to use injections.

"As a matter of routine, I at present give mercury by the mouth, or, when I desire a rapid effect, employ inunctions."

Dr. G. R. Fowler, of Brooklyn, says : "The method of medication in question has always seemed to me unscientific, or, to say the least, far fetched. It has never appeared to my judgment as a practical method when compared with that by the stomach and by inunction. It certainly involves some suffering on the part of the patient, and probably some dangers. I have yet to learn of sufficient advantages from its employment to compensate for its palpable disadvantages.

"It has not yet awakened in my mind sufficient enthusiasm to impel me to give it even a trial."

Dr. Algernon S. Garnett, of Hot Springs, says : "In my hands the hypodermatic treatment was abandoned for the following reasons : 1. The pain incident to the frequent use of the needle, and the accompanying inflammation due to the introduction of the mercury into the cellular tissue. 2. The uncertainty in regulating the *individual* dose. 3. The great difficulty in prolonging the treatment, where the tolerance of the drug is great, without perforating large areas of the skin.

"Where absorption by the skin and stomach has failed, this method might constitute the only safety for the patient, but such cases are rare and exceptional.

"My experience has been that patients too often get the local disturbance before the constitutional impression, and that the system has to be educated to the tolerance of a sufficient quantity of the drug if we would give protection for the future."

Dr. W. F. Glenn, of Nashville, says : "When Lewin first advocated this plan, I adopted it and used it considerably. My opinion may be briefly summed up as follows : 1. I found it very difficult to persuade patients to allow its use for any length of time, on account of the pain attendant upon the injections and the ulcers sometimes produced. 2. I did not think it proved more beneficial in ordinary cases than mercury by the stomach. 3. In malignant cases, where a quick, decisive action of the drug is desired, I believe inunction equal if not superior to it. 4. I have never seen the hypodermic treatment cure a case of syphilis in any shorter time than inunction or ingestion. 5. I believe that mercury given in any manner will require at least two years to accomplish the cure of syphilis, and in many a longer time."

Dr. Hingston, of Montreal, questions the value of mercury in syphilis, but

says he sometimes prescribes it, and adds : "I then prefer it by the mouth, and more still by inunction. My experience in the employment of mercury in the form of hypodermic injection is extremely limited, but I am not disposed to give this latter form preference over the older methods, while its indiscriminate use in the routine treatment of syphilis is open to many serious objections."

Dr. James Nevins Hyde, of Chicago, says: "I can say but very little on the value of the hypodermatic injections of mercurial preparations in the treatment of syphilis, because of a limited experience. I have watched, with some care, the results of this treatment on the continent of Europe; I have also tested the method in both hospital and private practice at home. But with me it stands in the category of 'last remedies'; and in syphilis I do not have to recur to last resorts sufficiently often to know much about them.

"I am not a pessimist but an optimist in all questions relating to the treatment of that disorder. I have, as we all have, seen the most formidable damage done in cases where the expert, watching the course of the disease from the very beginning, has had neither time nor opportunity to avert the consequences by the best of treatment and the greatest skill. I do not believe that in the worst of these 'galloping' and 'precocious' cases, as our French brethren call them, even the most energetic treatment will avert the results.

"I also believe that the enormous majority of all our other cases do very well indeed under our present methods of safe and slow treatment by inunction, fumigation, and medication by the mouth. I believe that more than seventy-five per cent of our American patients, under the treatment of our best physicians, escape tertiary symptoms. I am therefore in no haste at present to exchange for a method which is not without danger, others whose success compares very favorably with that obtained in the scientific management of other ailments of the human body."

Dr. William Judkins, of Cincinnati, says: "My experience with the hypodermatic method of treatment of syphilis is by no means satisfactory. I could in no one case continue it long enough to have what might be called 'a cure,' as abscesses would invariably form at the point of introduction (causing many to take their meals standing).

"In one case, in spite of all known precautions, cellulitis followed, with supuration, leaving a scar the size of a silver quarter. Fortunately, it is so situated that she rarely sees it, but the case, with others of less severity, decided me to abandon its use some time since.

"Considering the manner in which it was so highly commended, so much to be expected from its use, the results in my hands have been exceedingly disappointing."

Dr. Edmund E. King, of Toronto, says: "I have used hypodermatic injections very little. I believe their results to be misleading. I do not think it *cures*, but that in some cases it is a powerful adjuvant and brings the symptoms more rapidly under way, which permits systemic treatment a surer, quicker grasp on the case. I think, however, that it is a delusive treatment both to the doctor and the patient."

Dr. E. L. Keyes, of New York, says: "I do not think the hypodermatic use of mercury suitable for routine use in syphilis. I believe it impossible to 'cure' syphilis by a 'short course'—in this or any other method."

Dr. C. H. Mastin, of Mobile, says: "I can say, without the least hesitation, on that its use has never commended itself to my mind; that I believe its advan-

tages have been *greatly overestimated*; that its inconveniences and dangers have not been fairly stated, and that it offers no advantages over mouth ingestion, or the method of inunctions. In a word, I have been and am opposed to its use, considering it an innovation, with no rational basis for its support."

Dr. Prince A. Morrow, of New York, says: "I do not recommend the hypodermatic method in the systematic treatment of syphilis, nor do I believe that it will ever supplant the classic modes of administering mercury. I look upon it as a *reserve* treatment, to be employed in exceptional cases; as, for example, when gastro-intestinal irritability is so marked as to forbid the introduction of mercury by the stomach, or where the necessities of the case demand a rapid and intense mercurialization to save important organs, etc."

Dr. H. G. Mudd, of St. Louis, says: "Personally I am not prepared to speak the value of hypodermatic injections in this way, for I have depended almost entirely on inunctions and the internal administration of mercury in the systematic treatment of syphilis. Without having had much experience I have been rather afraid of hypodermatics of mercury."

Dr. W. K. Otis, of New York, says: "I desire to express myself as decidedly opposed to the treatment of syphilis by means of hypodermatic injections of mercury in any form.

"1. Because I believe that the patient can be brought under the mercurial influence more safely, comfortably, and satisfactorily by other methods.

"2. That it is unsafe, for, should symptoms of salivation appear, it is impossible to withdraw the drug, it being beyond control the moment it is injected.

"3. That this method is more uncertain in its effects.

"4. A certain amount of danger of producing abscess.

"In regard to the assertion that this method 'cures' syphilis in a much shorter period than others, it seems to me that only a very large experience, extending over a period longer than this method has been in existence, would establish this fact clinically, while theoretically I am inclined to doubt that such is the case."

Dr. E. R. Palmer, of Louisville, says: "I am absolutely without personal experience in the hypodermic treatment of syphilis, but have watched the subject-matter sufficiently to fully convince myself that there is nothing in it."

Dr. Roswell Park, of Buffalo, says: "I have never resorted to hypodermic use of mercurial preparations as a routine treatment. I have adopted this method only in severe cases, or those where symptoms were of speedy occurrence and seemed to call for the liveliest possible impression, or in rare instances where the system was intolerant of other methods.

"The method has never seemed to me one which would commend itself—in this country—or one which could rationally be expected to find general adoption either among the profession generally or the laity. I have no personal experience as to whether it can 'cure' or is capable of curing syphilis more quickly than other methods."

Dr. A. W. Stein, of New York, says: "I employed the hypodermic method at Charity Hospital years ago on a series of cases, and discontinued it because I saw no appreciable difference from the other methods of treatment."

Dr. Henry W. Stelwagon, of Philadelphia, says: "Some years ago while studying in Vienna, the method of treating syphilis by hypodermatic injections was being extensively practiced in the General Hospital, more particu-

larly in Sigmund's wards. I was impressed with the cleanliness of the method and also with the exact measurement of dosage thereby made possible, but its evident disadvantages, such as pain at the point of injection, sometimes lasting several hours or days, with often the production of an inflammatory cherry to walnut sized, deep-seated swelling, and not infrequently abscess formation, completely overshadowed, in my judgment, its few merits. In the light of experience, bearing the above observations in mind, I believe that an existing eruption may be made to disappear more rapidly by this method, but doubt very much that it has any advantage as to permanence of effect. In my own practice, covering about ten or twelve hundred cases of cutaneous syphilis, I have never felt called upon to go beyond the methods of treatment by mouth ingestion and inunction—except in one instance, a young man with a marked syphilitic cachexia and a malignant general large pustular syphilide, whose stomach rebelled against the drug, whose full digestive power was needed for nutritive repair, and whose condition of skin necessarily precluded the method by inunction."

Dr. F. R. Sturgis, of New York, says: "It is many years since I have used the hypodermic injection of mercury in the treatment of syphilis, and my reason for abandoning it was the great pain it caused, and the tendency which it had to produce abscesses in the cellular tissue. Indeed, the pain was so great that the charity patients at the hospital ran away rather than submit to the treatment. That it was in many cases efficacious I have no doubt, but I do not think that the advantages outweighed the pain, nor was its action any more certain and lasting than when mercury was given by other methods. I am very doubtful, indeed, if it cures syphilis in a much shorter period than when given by the mouth, or inunction, or fumigation, although in some cases it caused the symptoms to disappear a little more rapidly perhaps than they would have done under other circumstances. The preparations used were the bichloride, which was excessively irritating; then afterward calomel, which was less so; and, lastly, the albuminate, which seemed to be the best borne of any; but, as I say, I have not used it for many years, and think its use, certainly in private practice, is restricted."

Dr. James P. Tuttle, of New York, says: "My experience is confined to the use of the mercuric chloride, having never used any of the other salts by this method. In cases where an exceedingly rapid mercurial impression is necessary, I have found it the most prompt and effective method of administering the drug. I have never relied upon it alone for a cure, having always continued the use of the drug in tonic cases by the mouth, for some months afterward. The rapid subsidence of cutaneous and other symptoms of the disease through this method have been very gratifying to me and impressive to my patients. The pain which it produced is the only objection which I have found to it. I have never seen an abscess nor a permanent induration follow one of these injections. I believe the secret of this lies in the use of sterilized needles and solutions, in injecting deeply into the muscular tissues, and in massaging the parts for five minutes or so to promote absorption. My experience is limited to fifteen cases in all, perhaps two hundred injections, but, small as this is, it has been altogether favorable. That the method will ever supersede oral ingestion, inunctions, or baths, I do not believe; but in well-selected cases, where rapid effects are demanded, I believe it not only most useful but reasonably safe treatment for syphilis."

Dr. Arthur Van Harlingen, of Philadelphia, says: "About eight to ten per cent of the skin cases coming under my notice are of syphilitic origin, and the majority of them are light or of moderate severity and yield readily to the ordinary remedies given by the mouth. In some semimalignant cases I have found the hypodermatic use of mercury to succeed where the employment of mercury and other drugs by the mouth has failed. I regard this method, therefore, as a useful adjuvant to the ordinary modes of administration. I have never found any danger or serious inconvenience from the use of mercurials hypodermatically. I almost always use the bichloride. I have, however, tried several other preparations on a small scale, but without much satisfaction. In my experience the hypodermatic treatment of syphilis does not remove the lesions more rapidly than the ordinary treatment by the mouth, nor does it insure against relapses any more than the ordinary treatment does. I should never recommend its use as a routine form of treatment in average cases."

Dr. John Blake White, of New York, contends that no time should be lost in getting the patient under mercurial influence, and adds: "The syphilitic poison, like that of tuberculosis, affects more especially the glandular system, and the lymphatics are consequently slow to take up and utilize medicine taken by the mouth; therefore we must hope to affect the general system more surely and speedily through hypodermatic injections, the advantages of which I do not believe are exaggerated."

"As to 'curing' syphilis by this method, I am convinced that at least as much toward this result is effected by the hypodermatic method in a far shorter time, more surely, and as safely as by the administration of remedies per ore or by inunction."

Dr. W. N. Wishard, of Indianapolis, says: "I have not been sufficiently impressed, from my reading of the published experience with this method, to lead me to try it, and have consequently had no experience with it."

I must confess that I attach much importance to the foregoing opinions and practice of my colleagues in that society, composed of the leading syphilographers and genito-urinary surgeons of this country. I know them to be intelligent, alert, and ever on the lookout for anything that can improve their results as regards the comfort or the safety of their patients. Their views, and the opinions of such men as Fournier and Hutchinson, who stand in the front rank of syphilographers not only of to-day but of all time, far outweigh with me the one-sided statements, hasty generalizations, and untrustworthy reports of results which constitute so large a portion of the literature of hypodermatic injection. I do not mean to deny that there are men of great eminence and undoubted scientific ability who are among its advocates, but if we look for them among those who give it first place in the treatment of syphilis, they are relatively so few that they are lost among the seekers for novelties and the untrained and inaccurate observers who come to the front in such large numbers whenever an opportunity like this occurs.

I offer no apology for the extensive citations I have made, as the question is a live one, and every practitioner who undertakes the treat-

ment of syphilis—and who does not?—is interested to know the exact status of the method at the present day.

In the light of the evidence presented above it seems to me safe to assert that *the hypodermatic treatment of syphilis has not as yet shown results which warrant its adoption as a routine method to the exclusion of or in preference to other methods, but, on the contrary, has some apparently insuperable disadvantages and even dangers which render it improbable that it ever will be so adopted.*

2. The circumstances under which hypodermatic medication should be employed may be summarized as follows :

(a) Those cases in which other methods of treatment have been tried and failed. (b) Those cases in which, owing to idiosyncrasy or intercurrent disease, the skin and the digestive tract can not be used for the introduction of mercury. (c) Those cases in which, owing to grave and advancing lesions, rapid mercurialization is absolutely necessary. (d) Those cases in which obstinate localized lesions can be most directly reached by this plan. (e) Possibly those cases, referred to by Jullien, in which early differentiation between syphilis and malignant disease, or tubercular ulceration, is extremely important, should be included in this list. I certainly feel inclined to employ the method in all doubtful cases which admit of it, particularly in those conditions of the tongue which often leave the surgeon for a considerable time in doubt as to their exact nature. Anything which promises to shorten this period of doubt by rendering the therapeutic test more rapid and more certain would be of great advantage. I should, however, in such instances feel obliged to use potassium iodide by the mouth at the same time. (f) A theoretical possibility of the use of mercury hypodermatically has suggested itself to me, but I have not as yet actually employed it. It may be that its use by this method will aid in shortening the period of doubt which often intervenes between the appearance of the primary sore and the development of general adenopathy or of the exanthemata. If in the presence of a sore of uncertain character the employment of mercury hypodermatically resulted in exceedingly rapid cicatrization, no local treatment being employed other than cleanliness, it might occasionally throw light upon the case without being open to all the objections which attend the systematic and slower administration of mercury by the mouth (see p. 716). It is possible that the idea is worth a trial in exceptional cases, but I do not think it should be adopted as a routine practice for the reasons which have already been given in the section on the so-called abortive treatment of syphilis.

3. As to the choice between the two great classes of mercurials, the soluble salts are to be preferred to the insoluble in the large majority of cases, as more exact in the matter of dosage and much less dangerous, and

less likely to be followed by local disturbances. They are always to be used when there is need for rapid mercurialization.

The insoluble salts should probably be reserved for those cases in which frequent visits to the surgeon are impossible and in which no contraindications exist. In cases of defective kidneys, diabetes, profound anæmia, marked atheroma, great debility, etc., such methods are dangerous, and the case, even if urgent, will probably do better under some other form of treatment.

4. Finally, as to the special preparations to be employed :

Among the soluble salts the bichloride is probably to be preferred. The results from its use are not strikingly different from those obtained from the other compounds of this class, but its stability and great solubility and its germicidal qualities seem to warrant its selection. The disadvantage is the pain which it causes, but the evidence in this direction shows that in the hands of impartial investigators, not responsible for the introduction of the particular substance employed, each of the salts on the list produces a considerable amount of pain and a not inconsiderable number of accidents or complications. Probably the bichloride is freer from objectionable features, in respect especially to the production of suppurations, than any of the salts of mercury.

Among the insoluble salts, calomel and the yellow oxide are perhaps to be preferred. It would appear that the latter is a little less active, but at the same time much less irritating. Gray oil is the most available form of administering metallic mercury.

4. Vaporization.—This method, as applied to the general systematic treatment of syphilis, is now very rarely employed. I at one time made arrangements with the proprietors of some Turkish baths in Philadelphia so that my patients could be given a mercurial vapor bath on my prescription, but the time it required, the degree of publicity involved as regarded the bath attendants, and the lack of any evident superiority over other methods, resulted in its almost entire disuse in my practice. There are, however, cases, as of dense, small, widely distributed papular or pustular syphilides, in which the whole area affected could not well be reached by inunctions, but in which the mercurial vapor bath acts with remarkable efficiency.

The drug to be preferred is calomel. The average dose is thirty grains. Cinnabar, the iodides, and other mercurial preparations have been used, but have no advantage over calomel. Various apparatus have been devised for the purpose of administering mercury by vaporization. That of Henry Lee is an alcohol lamp surrounded by a wire screen and surmounted by a little saucer-shaped dish in a sort of water bath. That of Maury, of Memphis, is more elaborate. I have always found it easy to have the patient extemporize a stand for the calomel by converting a

piece of sheet tin into a table, bending over the ends at right angles, making two uprights of sufficient height to permit an alcohol lamp to be slipped beneath the central portion, on the top of which the calomel is placed (Keyes); or I have a tinsmith make a little tripod carrying a small saucer.

This apparatus is placed beneath a cane-bottomed chair, on which the patient sits naked, but with an ordinary blanket pinned around his neck and descending to the floor tentwise, covering in the chair. I have never found it necessary, nor do I believe it important, to make any provision for the production of steam at the same time. The warmth produced by the alcohol lamp will soon excite a sufficient perspiration to make the calomel vapor adhere to the surface of the body. Violent sweating by washing it off defeats the object of the bath. Twenty minutes may be spent with the lamp burning, and ten minutes to cool off in after the lamp is extinguished. Rest in bed for a couple of hours afterward, or for the night, is to be advocated.

I do not know of any one who is now using the method of vaporization in the systematic treatment of syphilis.

In my practice I have only employed it when the other plans had failed, or when a small, hard papular or pustular syphilide, or obstinate precocious ulceration was present. It is then invaluable. It is well to have some one with the patient, or at least within call, when these calomel vapor baths are being used, as the heat and the fixed attention sometimes produce syncope, and there might be danger of ignition of the blankets and serious injury.

The local use of this method will be described in the section on the treatment of special lesions (sec p. 803).

5. Mercurial and Thermal Baths.—Heat.—As a method for the treatment of general syphilis *mercurial baths* have been but little employed and present few advantages. Warm baths containing varying quantities of sublimate in solution have been recommended in some of the emergencies of syphilis, but can only be regarded as an uncertain and doubtful adjuvant to or substitute for other and more exact methods. They are occasionally of value in the treatment of widely diffused and obstinate syphilides, especially those attended with ulceration or pustulation. In such cases a bath in 1 to 50,000 sublimate solution may be of great use, not so much as a means of mercurializing the system, but rather for the sake of the direct effect upon the local lesion. The benefit of this is unquestionably increased by the antiseptic properties of the salt, which aid in overcoming not only the specific infection (syphilis bacillus) but also the pyogenic (staphylococci) infection which keeps up the suppurative or ulcerative process. Thus Ehrman (Archiv für Derm. und Syph., Bd. xxii, Heft 6, 1890), while objecting to

the employment of mercurial baths for the treatment of constitutional syphilis, on the ground that it is not possible to introduce in this way sufficient mercury into the system, highly commends this means of treatment in local manifestations of the disease. In papulo-pustular syphilides, papular and ulcerative forms of the disease, ulcerating gummata, and moist papules, the baths are most serviceable, particularly in cachectic patients, who do not well support a vigorous mercury treatment. The tubercular eruptions and gummata involving the skin also heal under this method of treatment.

Where certain regions of the body are involved partial baths are recommended : thus, in manifestations upon the genitalia the sitz-bath is useful ; and in plantar or palmar psoriasis, or syphilitic onychia, the hands or feet alone may be submerged.

Finger recommends highly in the pustular and ulcerative forms of the disease the following method : He dissolves two drachms to one ounce of the bichloride in water and adds the whole to a bath having a temperature of 78° to 80° F. This temperature should be maintained by the addition of hot water, while the patient remains in the bath for from one half to two hours. This is repeated daily, and should be followed by an hour in bed. If the lesions are only upon the limbs, an arm or foot bath will be sufficient ; for this, one drachm and a half to three drachms should be used. The absorption of mercury by this method he believes to be considerable, and the local action upon the lesions to be of great advantage.

Thermal baths, especially those at the various natural hot springs in different parts of the world, have been employed by thousands of syphilitics, and still have a great vogue. In this country the Hot Springs of Arkansas, abroad those of Aix, are the best known and most frequented. The general opinion of the profession is that the waters of these springs have no special remedial value, and that hot salt-water baths at the seashore, or even hot tub baths at a wholesome mountain resort, would be equally useful to the patients who derive the most benefit from the springs. That is certainly my opinion, and I have never seen or heard anything that makes me doubtful as to its correctness. The patients who should be sent to the springs belong to one or the other of the following classes :

1. Patients whose mode of life is objectionable, and who can not be controlled while under home or other customary influences. This includes not only the large class of hard drinkers, who are apt also to use tobacco too freely and to indulge in various other excesses, but also the much smaller class whose excessive devotion to work or business interferes with their general health and lessens their strength and vitality.

2. Patients whose symptoms resist full doses of the specific drugs, and who are unable to take larger doses without a breakdown of the digestive

apparatus, or the production of mercurial or iodic intoxication. Those especially should be sent who have involvement of the viscera, and still more particularly if the brain or spinal cord is affected.

3. Patients who with syphilis have intense syphilophobia, and require the mental impression and in addition the tonic influence of change of scene and climate.

4. Patients with defective elimination or with marked idiosyncrasy as regards either mercury or the iodides.

Although this seems a rather broad and comprehensive list, it must be remembered that I am not advising that all patients who belong to these classes should be sent to the springs. I am merely asserting that those patients who will derive the most marked benefit from them will be found in one or the other of the above groups. The routine method of treatment employed at the various springs demonstrates that the very competent physicians who are usually found there do not depend upon the waters for their cures, but, aided by them, give an even more active course of mercury and the iodides than is customary in private or hospital practice. I have already described the method employed at Aix (see p. 757). That in use at the Hot Springs here is somewhat similar. The most successful of the local practitioners use large doses of mercury by inunction, and, if the symptoms call for it, equally large doses of the iodides. Fordyce, who resided there for three years, makes the following interesting remarks as to his observations in from ten to thirty cases daily:

As the majority of these patients used both the hot baths and some form of mercurial treatment, it is difficult to estimate the relative value of each. Occasionally, however, I would see a patient who, either through excess of faith in the hot water or from fear of mercury, would bathe in and drink of the water, without other treatment, for a period of several weeks or months. I have observed such patients both before and after a prolonged use of the baths, but in none of them have I been able to detect any change in the disease which could be attributed to the water. As soon, however, as a mercurial treatment was commenced, improvement would begin and continue.

Many patients come to the springs after a prolonged mercurial course at home, laboring under the impression that their system was full of mercury, and hoping by the use of the hot water to "boil it out." Patients of this class have developed ptyalism after a number of baths, thus supporting the common opinion that the waters have an influence in eliminating the drug. This effect is probably due to the increased capillary circulation, favoring tissue change, and greater activity in the elimination of matter foreign to the tissues. Individuals who come from a malarious district, though having suffered no acute outbreak for years, often, after bathing for one or two weeks, develop some form of malarial fever; gouty subjects, too, after hot baths frequently have an acute outbreak of their trouble. These phenomena are well known to the bath physicians as every-day occurrences. It is observed, also, that new

growths, especially those of a malignant character, take on increased activity of development after the use of the hot baths, so that it is a matter of common report at the springs that persons affected with cancer should not use the hot water.

It would be quite rational to suppose that the increased tissue change which hot baths are known to produce could be utilized to advantage in combating a new growth of such unstable character as the neoplasms of syphilis; and, in fact, the last stages of the disease seem to be especially benefited by the use of the baths in connection with specific remedies. How much of the cure depends upon the increased power of digestion and assimilation caused by the change of air, scene, and diet, and how much on the baths, is difficult to say. I have seen, however, patients in a profound state of cachexia from old syphilis improve rapidly at the springs—patients who had been in charge of competent physicians at home, and who had taken mercury and iodide of potassium to the limit of tolerance.

Whatever theoretical considerations may be brought forward, experience shows that many cases of late syphilis are more quickly cured at the springs than at home. I have never, on the other hand, been able to convince myself that the early stages of the disease were more rapidly cured there than under the inunction method at home. Still, as many patients are unable to carry out this method of treatment, or are under the care of physicians who do not appreciate its importance in producing rapid relief, or understand its technique, the comparison which the patients make between the relief obtained at home and at the Hot Springs results in favor of the latter, and to the springs is given the credit which should belong to the method of employing the drug. The liberal use of hot water internally and in bathing undoubtedly increases the activity of the organs of excretion, possibly enabling the patient to tolerate the drug in larger quantities. Ptyalism and irritability of the gastro-intestinal canal, however, frequently occur, necessitating a cessation of all medication. I recall now two cases of death from the use of large and long-continued doses of the iodides—one from gastro-intestinal inflammation, the other from heart failure. It is not claimed by the bath physicians that relapses are prevented by a course of mercurial inunctions; on the contrary, the patients are told to continue the use of mercury on returning home, and when practicable to return again in a year or two. Many patients anticipate such relapses by annual or periodical visits.

The beneficial effects of the hot baths are probably as much overrated by the bath physicians as they are often underestimated by the physician away, self-interest in both cases modifying the advice given.

These remarks represent a fairly conservative, and I believe a just estimate of the value of the springs. They are, in the main, concurred in by American syphilographers.

Lustgarten (*Annual of Univ. Med. Sci.*, 1891, F. 43) has expressed practically the same views as regards the Continental resorts. He states that the chief therapeutic benefit derived from the springs is the hot bath itself. These baths accelerate elimination by mechanically removing epidermis, and, by producing a more active circulation of the skin, facilitate the absorption of mercury.

The sulphur baths do not differ in their action from those of indiffer-

ent springs. The chloride-of-sodium and iodine-brine baths seem, however, decidedly to increase oxidation.

Fournier particularly advises hot baths during the intervals of syphilis. He thinks that much of the advantage derived by patients from visiting baths is no doubt due to climate, and adds: "When, in spite of rational treatment, relapses occur in quick succession; when the disease assumes a malignant form, and the patient becomes intolerant of specific medication; when there is marked and obstinate involvement of the bones, glands, or nervous system, or when mercurial cachexia is developed, the sulphur and salt springs may accomplish good results."

The subject should not be dismissed without mention of the danger which is incurred by many syphilitics from overconfidence in the healing virtues of the Springs. This leads them, after a short sojourn there, during which their symptoms disappear, to imagine that they are entirely cured and to neglect subsequent treatment, thus substituting for the prolonged course which they require a short and heroic treatment, which in this, as in the case of hypodermatic medication, is to be unsparingly condemned. I have had many such patients who came to me with late phenomena, and who were disposed to feel themselves ill-treated or defrauded in the lack of the "cure" which they had confidently expected. Sometimes their expectation has been due to the ignorance of medical advisers who sent them to the springs with a far too flowery description of the resulting benefits. Oftener it arises, as I have said, from the ignorance of the patients. I have no reason to believe that the theory of rapid and permanent cure receives any support from the physicians who practice at the springs.

The general subject of the use of *hot baths* in the treatment of syphilis has been investigated by Borovski (Journ. of Derm., 1889, vol. ii, p. 22), whose conclusions (commended and quoted by Taylor, *op. cit.*) are as follows:

The clinical observations were made on twenty-eight syphilitic patients. Heat was employed in the form of (a) ordinary hot-water baths at 98° to 104° F., of thirty minutes' duration; (b) artificial sulphur baths (prepared by adding one pound of sulphur to each bath) at from 100° to 104° F., of from twenty to thirty minutes' duration; and (c) hot-air baths at from 180° to 200° F., of from fifteen to thirty minutes' duration. Dr. Borovsky's results may be summarized as follows: 1. Both tepid and hot-water baths, as well as those of sulphur and hot air, invariably increase the elimination of mercury in the urine. 2. The elimination proceeds more energetically the higher the temperature to which the patient is exposed. 3. The cause of such intensified excretion of mercury should be sought in an increase of the systemic metabolism, accompanied by the disintegration of mercurial albuminates. 4. A mercurialized patient's organism actually can be completely freed from mercury by means of a systematic employment of heat in one form or another. 5. In such cases, when the

elimination of mercury ceases spontaneously, it can be made to reappear by the use of hot baths. 6. Mercurial stomatitis can be cured by heat more quickly than by any other means. 7. Hot-air baths, while inducing an enormous perspiration, promote the elimination of mercury also through the sweat-glands. The total quantity of sweat excreted during a bath amounts to four hundred cubic centimetres and more; that of mercury in the sweat to 1·6 milligramme and more per four hundred cubic centimetres. Hence, as a means for freeing the patient's system from mercury they should be preferred to all other baths. 8. The appearance of mercury in the sweat naturally suggests that diaphoretics generally are useful adjuvants in the treatment of mercurialism. 9. Tepid baths (88° F.) should only be resorted to in cases of hydrargyrosis in which higher temperatures are contraindicated on some grounds. 10. Hot-air baths are borne by patients better than hot-water ones (98° F.), which sometimes give rise to fainting. 11. Hot-air baths at 170° or 180° F., of twenty minutes' duration, were borne better than those at from 140° to 160° F., of thirty minutes' duration, while the physiological and therapeutical effects of the former are practically identical with those of the latter. 12. In persons having an idiosyncrasy against mercury the employment of heat sometimes affords the possibility of safely continuing mercurial treatment. 13. Hot-air baths, while inducing intense thirst, involve an increased ingestion of fluids, which in its turn leads to an increase in the bodily metabolism. 14. As regards the elimination of mercury from the organism, artificial sulphur baths do not offer any advantages whatever over other baths. 15. The time required for the complete excretion of the metal from the patient's system varies according to the total amount ingested, individual peculiarities of the patient, temperature of the baths, etc. 16. A simultaneous treatment of syphilis by mercury and heat may sometimes effect a cure more quickly than a mercurial treatment alone. 17. The heat treatment alone (one or two baths daily for a fortnight), however, usually proves powerless to bring about a cure. 18. In patients with diseased vascular system the use of hot water requires great caution.

Kalashnikoff (Brit. Jour. Dermatology, November, 1889) observed on thirty-one patients the effect of heat applied to the surface. In cases in which there were widespread syphilides the most affected limb of the patient was placed in a hot bath (115° F.) for half an hour twice daily. During the intervals warm compresses were kept wrapped about the parts. Where the lesions were in such portions of the body that baths were impracticable, hot fomentations, or the hot-water bag (111° to 122° F.) were applied for an hour twice daily, the treatment during the intervals of application being the same as before. In one group no mercurials were used; in the other, inunctions or injections of mercury, with or without the iodide of potassium, were employed. Kalashnikoff's conclusions are: 1. Heat, applied locally, powerfully promotes the resolution of syphilides in the region treated. 2. Syphilides of all kinds disappear more rapidly under the influence of heat than under that of a mercurial treatment. The primary indurated sore is resolved in from eight to sixteen days without leaving any sclerosis; roseola and papular erythema in from four to eight days; papules and superficial impetiginous syphilides in from eight to twenty-one days; nonulcerating tubercles and gummata in from seven to twenty-four days; ulcerating ones become cicatrized in from one to six weeks; periostitis disappears in from one to twenty-four days; osteocopic pains subside in from three to eight days. Commensurate with these local changes, the patient's gen-

eral condition is markedly improved. 3. By the use of heat and mercury a more rapid absorption is promoted than by the use of either agent alone. 4. In cases of relapse the comparative immunity of parts treated by heat is striking. 5. Heat is especially indicated in such obstinate condylomatous lesions as refuse to yield to mercury or iodides. 6. Heat is contraindicated in those whose weakness is so great as to render dangerous the necessary mechanical disturbance, and in case of moist papules where dusting with calomel will be found more satisfactory.

General hot baths (106° F.) of ten or fifteen minutes' duration act favorably upon syphilitic manifestations, especially when followed by packing in woolen blankets.

Usass has, to an extent, confirmed the accuracy of these conclusions, while Fisher argues that syphilis can be actually cured by heat.

Tarnovsky (Vratsch, St. Petersburg, 1889, Nos. 5, 9), while admitting that local applications of heat will cause rapid disappearance of the syphilides, states that after this treatment the disease is peculiarly prone to attack the viscera, producing exceedingly grave lesions. Hence, the latter repudiates the treatment of syphilis by heat.

Stepanow advises the use of warmth by means of rubber bags filled with water as hot as the hand can bear, and claims that—

1. It should have a valuable place in the treatment of skin manifestations.
2. Healing follows every application of heat more quickly than any other method, the operative excepted.
3. Syphilitic and nonsyphilitic indurations soften by the application of heat.
4. It operates by increasing the function of the skin, the blood-vessels, and the food supply.
5. It tends to remove blood-stasis and to relieve pain.

Electric baths have been recommended and employed by various observers.

Kronfield (Wien. med. Woch., July 25, 1889) describes an electric bath so constructed that the tub in which the patient lies is divided into two compartments, the water in each being separated, so that a current of electricity carried into one can be transmitted into the other only through the patient's body. When these compartments are filled, a powerful stream of electricity may thus be utilized for the purpose of causing absorption of mercury. On the basis of numerous experiments and examinations of urine, it was found that by means of these electrical baths, about three drachms (11.66 grammes) of bichloride of mercury being added to each, the rapid absorption of the medicament could be brought about, and, as a consequence, there was a disappearance of specific symptoms.

Gaertner and Ehrman also warmly commend sublimate electric baths. Examination of the urine showed that there was rapid absorption of mercury. They conclude that the amount of the drug absorbed is proportional to the strength of the current and the length of time during which its application is continued. They also believe that accurate dosage is possible.

The *elimination of mercury* from the system has been carefully studied by Lindén (Finska Lakareska elekapets Handlingar, p. 191, 1892), who found that electrolysis showed the presence of mercury in the urine, two to two and a half hours after injections of mercurials—that is, during

the time required to excrete three hundred cubic centimetres of urine. It increased rapidly in amount for the first twelve hours, then remained the same during the first and second days. The quantity eliminated then gradually diminished, some remaining present till the end of the first or beginning of the second week. After repeated injections the amount in the urine increased rapidly till the third or fourth day, and diminished till the end of the first week; during three or four weeks a slight quantity is found, but this entirely disappears at the end of two months.

The elimination and appearance in the urine is slower when either the skin or alimentary tract are used as means of approach.

Schuster (Journ. of Cut. and Gen.-Urin. Dis., vol. i, p. 353) found that mercury introduced through the skin or in any other way is irregularly eliminated by the urine, but regularly and completely by the *fæces*; that this elimination, after extensive courses of inunction, is complete in about six months; and that, accordingly, persistence of mercury in the organism—the *bête noir* of many of the laity (see p. 726) and of some practitioners—does not occur.

The Use of the Iodides in Syphilis.—Since the publication of Wallace's observations at the Gervis Street Hospital, Dublin (1834), as to the value of potassium iodide in syphilis, and the later writings of Ricord and Trousseau, the iodides have had a place in the treatment of syphilis only second to that occupied by the mercurials.

The *rationale* of their action is not so clear (see p. 738); but it is certain that it does not depend, as was once thought, upon their influence on the residue of mercury left over in the tissues from a previous mercurial course, and rendered soluble and potent through the presence of iodine.

The observations of Melsens and Guillot, long quoted in support of this view, have recently been contradicted by Suchoff (Vratsch, 1886, vol. vii, p. 840), who asserts that the administration of the iodides really retards the elimination of mercury.

Further, it has been shown, on the one hand, by Schuster and others (see *supra*), that by the unaided processes of Nature mercury is completely eliminated from the tissues in a period of about six months after its use is discontinued, and, on the other hand, that in appropriate cases, even when there has been no previous mercurial course, the iodides exercise their usual beneficial influence.

The old statement that "mercury cures, iodine relieves syphilis," may come to have a scientific foundation through modern bacteriological research; viewed as a germicide, the former is incontestably superior; and this probably explains its far greater value in the earlier stages and the comparative inefficiency of iodine during that period. Although I believe this to be a well-established clinical fact, there is some diversity of opinion about it, based upon the alternative theories which regard iodine

(a) as a direct specific, and (b) as a promoter of the absorptive and eliminative processes.

If the former view were correct, it should certainly be employed oftener and more freely in the secondary stage than is at present the custom. Many general practitioners do so use it, but as a rule they are not of a class whose ability or experience carries much weight. I think most syphilographers would agree with Hyde, who says (*Therapeutic Gazette*, March 15, 1889) that "a coarse test of any physician's expertness in the management of the disease is to be found on his use of the iodides; most general practitioners hastily employing them at a time when the specialist finds no indication for their use." The views of those syphilographers who hold the opposite views have been summarized by Mauriac, who says that though the action of the iodides may be less rapid than that of mercury, it is deeper and more durable, and is useful in those accidents that are graver, more destructive, and less liable to heal spontaneously; their sphere of action is therefore much greater than that of mercury, and their relative harmlessness is a great advantage. According to him, the indications for their employment are: (1) The phagedenic forms of the initial lesion; (2) in the beginning of the secondary period especially to combat the fever and headache; (3) in the erosive and ulcerative syphilides; (4) in all the syphiloderms of transition, the papulo-squamous and papulo-tuberculous; (5) in all tubercular and all malignant syphilides; (6) in all subdermic syphilitic manifestations, in gummata or gummatous exudates that break down and ulcerate.

On the other hand, Sigmund, though he sometimes uses the iodides in combination with mercurials, or alone in the milder syphilitic manifestations, as erythema and papillary eruptions with general lymphatic involvement, does not think it possible that they can replace the mercurials, and usually reserves them for employment in very marked general lymphadenitis, in scrofulous constitutions, in rheumatoid diatheses and headaches, accompanied or not by loss of sleep; in unfavorable hygienic or dietetic conditions, in diseased conditions of the gums and teeth, and in general in all those conditions in which the idiosyncrasies of the patients or the constitutional complications contraindicate the use of mercurials.

Finger believes in the combined use of the iodides with the mercurials, in the later stages of the syphilitic treatment, when, he thinks, they are superior to the mercurials; but Neumann often uses them in the mild relapses of the secondary stage and in those of the tertiary, reserving the mercurial treatment, in the form of inunctions, preferably for the severer manifestations of both periods. He considers the iodides especially useful in periostitis of the joints, muscles, or synovial sheaths of tendons, and in the tertiary affections of the eyes and internal organs, when he uses mercurial inunctions also.

I have thought it well to indicate these slight differences of opinion and custom, although I believe that the value of the iodides is so little in an ordinary case of secondary syphilis that it is more than counterbalanced by their irritant effect upon the gastro-intestinal mucous membrane.

Moreover, Taylor asserts (*op. cit.*, p. 68) that he has many times seen syphilitic infiltrations in the skin and mucous membranes have their starting points in inflammatory foci, caused by the iodides.

As a rule their therapeutic value increases in a direct ratio with the age of the syphilis. I would accept, however, some of the indications mentioned by Manriac, and believe that even in early syphilis the iodides should be added to the mercurial treatment whenever extensive and dense exudation has occurred, whether in the deeper layers of the derm, in the subcutaneous connective tissue, in the periosteum or bone, or in the viscera. In these precocious phenomena their influence is but little less useful than in the same conditions seen later in the disease.

The routine use of the iodides has already been sufficiently described (see p. 738). I may add here that, though they have sometimes been abused and are often given in unnecessarily large doses, I still think that the old rule of measuring the required amount by the effect upon the symptoms is a useful one. It leads occasionally to the administration of enormous doses, to be sure; but if the case is at all a serious one, and if the diagnosis be assured, the effects of the drug are not to be compared in possible gravity with those of the disease. Used in this way the practitioner will often be gratified to find the iodides finally causing the disappearance of obstinate osteocopic pains or violent cephalalgias, the resolution of large and threatening gummatous swellings, the subsidence of periosteal nodes, the cicatrization of enormous ulcers, the return of power to paretic or paralyzed muscles, the cessation of epileptiform convulsions, and even the re-establishment of the mental faculties after they have been persistently and to all appearance hopelessly disordered.

There is nothing more satisfactory in therapeutics than the direct and unmistakable benefits following the administration of the iodides in such cases.

In doubtful cases, for diagnostic purposes, large and increasing doses may also be given, sometimes with the result of promptly revealing the specific character of the lesion requiring treatment. It must be remembered, however, that other obscure conditions than those resulting from syphilis may be benefited by full doses of the iodides, and a faulty diagnosis and prognosis may be the outcome of a too implicit dependence on the "therapeutic test." Still more dangerous, in my opinion, would be the acceptance of the rule formulated by Jullien and H. C. Wood. The former asserts that "the existence of syphilis contributes powerfully to-

ward producing tolerance of the iodides. Experience proves, in fact, that in persons free from this poison the toxic phenomena of iodism are much more to be dreaded. In the same manner an antidote may be dangerous, or even fatal, when the organism is not under the influence of the poison which it is intended to combat."

The latter says: "In all cases of doubtful diagnosis the so-called therapeutic test should be employed; and if sixty grains of iodide of potassium per day fail to produce iodism, for all practical purposes the person may be considered to be a syphilitic."

These statements, if well founded, would convey an important practical lesson of the greatest value in the diagnosis of obscure conditions suspected to be of syphilitic origin. If unfounded, they may be seriously misleading. Dr. Wood contents himself with the simple statement of what he believes to be a clinical fact, confirmed by his experience in large numbers of cases of disease of the nervous system. Jullien, in addition to appealing to experience, advances the theory that iodide-poisoning resembles the overaction of an antidote in the absence of the poison for which it is administered. He appears to think that this offers a satisfactory explanation of the circumstances. They agree essentially in the statement that in doubtful cases the failure to produce iodism by large doses of the iodides may be considered to point strongly toward the existence of syphilis.

The question is certainly one in which every practical physician is interested. If the above statements are correct, their truthfulness should be established beyond a doubt by the collective experience of the profession; if incorrect, they are, as I have said, liable to be seriously misleading and dangerous.

In considering this important subject it must not be forgotten that, in weighing the probabilities of the case, the negative evidence can not be considered as nearly so strong as the affirmative. In other words, while every one would admit that the rapid disappearance of serious cerebral symptoms under the use of large doses of the iodides was strong presumptive evidence that the cause of these symptoms was syphilis, yet, on the other hand, if a similar case failed to respond to the same doses by an equally prompt disappearance of symptoms, it would not be safe to assume that therefore the disease is not specific.

If, however, in the latter case the large doses of iodides failed to produce the condition known as iodism, would it still be sound practice to base further treatment upon that fact, believing that, in spite of the persistence of the symptoms, the disease was probably specific?

Whatever may be our views as to the cause of iodism (see p. 746), it is equally difficult to understand why the existence of syphilis, and particularly of late syphilis, should exert any preventive influence. Jullien's

theory, which explains the alleged tolerance of large doses of iodide by syphilitic subjects through the presence of a poison, the destruction of which is supposed to exhaust the activity of the drug, can hardly be considered tenable. In a majority of syphilitic subjects the indications for the free use of iodine do not exist until the later or so-called tertiary stage, when the disease has lost all the peculiarities which indicate the presence in the blood and tissues of a living, active, generalized virus. Syphilis has then become nonsymmetrical, noncontagious, and in many cases nontransmissible, and it is in the highest degree improbable that any virus exists in any form which would so neutralize the effect of the iodine or the iodides as by that means alone to prevent their action upon the healthy tissues. It is evident that if the theory in question—namely, that tolerance of large doses of the iodide is, other things being equal, symptomatic or indicative of the existence of syphilis—is to rest upon clinical evidence, the cases which support it, or which can be adduced as arguments *pro* or *con*, must be very rare, and should include only those in which there has been opportunity for comparing in the same individual the action of full doses of iodides, before and after the contraction of syphilis. If the overwhelming and predominant influence of “idiosyncrasy” be admitted, the fallacy of assuming that special deductions as to the existence or nonexistence of any disease may be drawn from the production or nonproduction of iodism becomes evident. The large majority of the cases of syphilis which come under the notice of the neurological specialists are in the later stages, and the difficulties of diagnosis are often extremely great. While it is fair to assume that the rapid disappearance of coma, stupor, epilepsy, cranial pain, motor paralysis, and hemiplegia, under the influence of either large or small doses of the iodides, gives good presumptive evidence that the case is syphilitic, we can by no means assert that the persistence of those symptoms during the free use of iodides negatives the syphilitic theory of their origin. Seguin (*Archives of Medicine*, vol. xii, p. 128, 1885) has called attention to the fact that since Heubner has shown that very often in cerebral syphilis the lesion consists in obliteration of large arteries, with resulting ischæmia of a cerebral territory, and its death or softening, we must modify our prognosis and treatment. The moment that cerebral tissue undergoes such a process it is dead, and can not be restored by any amount of iodide of potassium or of any other drug. The syphilitic lesion, in other words, may be amenable to treatment, while its residua are not. Now if, in such a case, iodide of potassium were administered without result, but with the production of iodism, after moderate or even large doses had been given, from the statements of Professors Wood and Jullien, we would be led to the conclusion that the case was nonspecific, the failure to cure and the appearance of iodism both pointing in that

direction. This might lead to the neglect of treatment of the greatest importance to the patient; for, although it might not be possible to replace tissue already softened and disintegrated, further extension of the specific element of the disease process could readily be prevented. It might be possible to prolong life, even if entire health could not be restored. If, on the other hand, we are dealing with a case of chronic encephalitis or of apoplectic or embolic softening, due to other causes, but with a suspicion of syphilis, and if the patient's idiosyncrasy permits of the use of large doses of iodides without the production of iodism, we may be led by the above rule, from a rational understanding and treatment of the case, into an unwarranted dependence upon a specific treatment. I have searched vainly through the literature of syphilis and the records of the therapeutic and toxic action of the iodides for any evidence corroborative of the above theory, but without much result. Barton, of Dublin, says that it is well known that iodide of potassium acts in a different manner upon the syphilitic subject from what it does upon others, and that large doses may be given to such patients for months without the production of any rash whatever; and I find a few similar statements indicating a moderately widespread existence of the same opinion; but, with the single exception of Jullien, I have not found it advanced by any syphilographer, the great majority of whom would doubtless agree with Mr. Hutchinson in the statement that the skin eruptions which may be produced by the iodides are certainly due to idiosyncrasy, and have little or no relation to the dose employed.

A few years ago Dr. Wood and I discussed this subject (*Therapeutic Gazette*, December, 1888), and subsequently I asked for and obtained the opinions of twelve of the leading syphilographers and neurologists of the country, who, without exception, agreed with me in the view that no such rule for diagnosis could be formulated.

From among the interesting replies which I received I may make a few quotations, not so much in pursuance of this argument as for the reason that they constitute valuable practical contributions to the therapeutics of syphilis, and as such are worthy of being put in more permanent shape (*Therapeutic Gazette*, March 15, 1889).

Taylor said: "As to the action of the iodides in nonsyphilitics, my experience has convinced me that these salts are well borne by very many patients of both sexes and of all ages. In some, however, they produce such lesions and affections as dermal inflammations, coryza, and lachrymation, oedematous swelling of the parts supplied by the fifth nerve, cerebral hyperæmia, mental and physical depression, and gastro-intestinal irritation.

"Of these cases it may be said: 1. They may be persistent even when all possible means of amelioration have failed. 2. That in many instances, if the drug is pushed, notwithstanding perhaps some discomfort to the patient, these unpleasant and sometimes alarming phenomena will cease, and the drug will

not be in any way harmful, and actually beneficial. 3. In some of these cases we, as they say, 'weaken' too quickly and give up the drug; whereas, if with proper moral courage (the urgent necessity of course existing) we increase the dose and go ahead, toleration is established. In many cases in my experience small initial doses have produced mischief, while the succeeding larger ones have been very acceptable. 4. In many cases, abstinence from liquors, alcoholic and fermented, care as to the simplicity and easy digestibility of the food, requisite medication for the stomach, and a general improvement of the alimentary canal, will be followed by a proper acceptance of the drug, perhaps with some preliminary skirmishing. 5. I have seen several cases in which the iodides were well borne previous to the onset of pathological changes in the kidneys, and after the evolution of the latter they were more or less toxic in their action, sometimes so much so that their administration was of necessity suspended. 6. I call to mind three cases in which, while the patients were high liver and deep drinkers (one exclusively of champagne), the iodides were not borne without great discomfort, but when they discarded these irritants and stimulants the iodides produced no discomfort (cerebral, dermal, nasal). 7. I have seen cases in which an intolerance of the iodide of potassium lasted twenty years, and at both ends of that period produced a characteristic bullous eruption.

"My experience has not convinced me that syphilis gives a man any immunity, partial or complete, to the toxic action of the iodides. Indeed, in general the experience I have already detailed with virgin subjects applies to syphilitic individuals. The secret of very many cases rests in the fact that dire necessity compels the continuance of these drugs, and the so-called intolerance is forgotten. In syphilitics, as in healthy subjects, an intolerance of to-day may be replaced by a condition of assimilation a month, a year, or several years hence."

Bryson said: "I am quite within bounds when I say that fully fifty per cent of the cases of late syphilis treated by me exhibit iodism long before sixty grains per day is reached. In fact, it is only in a minority of the cases that some of the toxic effects fail to show themselves before a dose of thirty grains per day is reached. If we include all the untoward effects of the iodides which we see in the eyes, nose, pharynx, fauces, mouth, stomach, skin, and nervous system under the term of iodism, I can not make out that the size of the daily dose bears any relation whatever to their appearance. So far as I can see in practice, a given patient who bears five-grain doses thrice daily, without any toxic effect, will bear equally well twenty-grain doses repeated at the same intervals. My own observations, then, accord with the assertion of Jonathan Hutchinson, that the size of the dose bears no relation to the frequency of the toxic effects. The most dangerous case of iodism which I ever had in my practice followed quickly upon a three-grain dose. When an important viscus (brain, liver) is threatened, or when any organ is having serious damage wrought in it by syphilis, I do not suppose that any one would be deterred from pushing the remedy by the occurrence of a minor evidence (acne, coryza) of iodic intoxication."

Hyde remarks: "We may entertain the suspicion that, if we only knew enough, there need be no intolerance whatever of the iodides by any person. The mischief is, we do not know how to establish toleration for some patients, while we do know for some others how to compass this end. Any conclusions based on different methods of administering the drug in different periods of the life of one person must be practically worthless. Given a uniform method and

uniform conditions, and the number of idiosyncratic patients becomes rapidly smaller. Of this I am thoroughly convinced by experience. A few years ago I began to use only one method of administering the iodides, and by this term it may be conceded that all parties to the discussion intend to designate chiefly the iodide of potassium. That method was to employ a saturated solution, one grain to the minim of distilled water, given in milk, when that vehicle was not found to disagree as an article of diet with the patient to be treated. The dose was made, at the outset, not more than five to ten drops, the increase was ordered every three or four days, and in face of the chemical dictum lately set forth that the drug should always be given fasting, it was ordered after a small quantity of food was ingested. In this way the larger doses, as high as eight hundred grains daily, have been reached. I note, in passing, that it is my conviction that the very largest doses reached have not seemed as valuable as those which may be described as 'large,' the majority of all brilliant results being attained, I think, by a dose within rather than beyond two hundred grains daily.

"Observance of a uniform method in scores of cases soon led to the conclusion that 'idiosyncratic' patients were far fewer than was at first supposed. Careful graduation of the dose, and elimination of the cases in which the patient, eager for aid, surreptitiously swallowed more than his dose, threw new light upon this question. Again, the marked idiosyncratic exceptions that were observed soon occurred with symptoms of intoxication not cutaneous in type. Violent abdominal pains, tumefaction of the belly, grave prostration, and indefinable nervous impressions, which patients found difficulty in describing, but which they referred to with evident horror—these were of the class that proved exceptions to the rule. The symptoms of iodism strictly cutaneous in type were those suddenly occurring at the outset of administration of the drug, in non-syphilitic (often very young) patients treated somewhat awkwardly by general practitioners for eczematous and other diseases of the skin. Let me note, in passing, on this part of the subject, that of these cutaneous rashes, one, I am satisfied, is etiologically separated from all others. Whether the others be reflex, vaso-motor, or tropho-neurotic phenomena, or whether they be in part due to abortive efforts at elimination of iodine by the emunctories, it is certain that severe forms of purpura, even at times alarming in grade, may ensue long after full toleration has been established, being displayed most conspicuously in the lower extremities and over the belly. This, there can be but little question, is due to weakness of the vascular capillaries (probably induced by both syphilis and iodine intoxication long continued), a condition in the adult not greatly different from some of the reported forms of hæmophilia due to inherited syphilis."

The different formulæ which have been used for the administration of the iodides are numberless. A few have already been given (see p. 739). The saturated solution—℞ Potass. iodid., ℥ ss., aquæ f ℥ ss., two drops of which contain one grain of the salt—provides an easy and efficient method of steadily increasing the dose. Starch water has been used as a vehicle, as have various sirups and mucilages. They have also been given in baths, by enema and hypodermatically, but these methods are only valuable in emergencies, and not very reliable even then. In my own ex-

Taylor strongly recommends the fluid extract of coca, and uses the following formulæ:

℞ Fl. ext. erythroxyton cocæ f ℥ ij
Tinct. cinchon. comp.,
Tinct. gentian. comp. āā f ℥ ij. M.

Sig. Two teaspoonfuls in a wineglassful of water three times a day, an hour after meals.

℞ Fl. ext. erythroxyton cocæ f ℥ ij
Tinct. gentian. comp.,
Tinct. cinchon. comp. āā f ℥ j
Elix. calisayæ f ℥ iv. M.

Sig. One tablespoonful in a wineglassful of water three times a day, one hour after meals.

I have not found it so good as an ordinary tonic mixture such as the following, which I am in the habit of prescribing for use by patients whose appetite, digestion, or nutrition needs attention:

℞ Strychniæ sulphat. gr. j
Acid. phosphoric. dil. f ℥ iij
Liq. pepsinæ q. s. ad. f ℥ iv

M. et S. One teaspoonful in water after each meal and before going to bed.

The use of arsenic in syphilis has been suggested, but apart from its tonic properties, or its effect in controlling iodic acne, it has no special value. The use of potassium bichromate, as recommended by Guntz, has still less to justify it.

THE LOCAL TREATMENT OF SYPHILIS.

1. **The Chancre.**—The indications for canterization and excision have been fully discussed (see p. 720). Topical applications to the chancre have been suggested in endless variety. I think that most sores should be treated on general surgical principles, and that while the principle of antiseptis has here but minor value, it may yet be applied with advantage and with the effect of hastening cicatrization, even if it has no influence in aborting or modifying the constitutional disease.

I have found the following formulæ very useful:

℞ Hydrarg. bichloridi gr. $\frac{1}{16}$
Zinci sulpho-carbolat. ℥ j
Ext. opii aq. gr. xij
Aquæ ros. f ℥ iv

M. et S. Apply by means of a pledget of cotton. Change every two hours. Dilute if painful.

℞ Acid. boric. ℥ ij
Tinct. opii f ℥ ij
Liq. plumbi subacet. dil. f ℥ ij

M. et S. Apply locally.

R	Zinci chloridi	gr. v
	Tinct. opii	f ʒ j
	Aquæ ros.	f ʒ iij
M. et S.	Apply locally.	
R	Acid carbolici	gr. v
	Aquæ destillat.	f ʒ j
M. et S.	Apply.	

Pyoktanin, hydrogen peroxide, bismuth subiodide, salicylic acid, salol, eunophen, zinc oleate, and dozens of other remedies new and old, have been employed, but I have found none of them to possess any special value.

Silver nitrate in sluggish sores has the same beneficial effect that it has upon similar sores which are nonspecific. It should be used in a strength of from twenty to forty grains to the ounce of water.

If the chancre is covered by a tough false membrane beneath which there has been double infection (syphilitic and pyogenic), and is extending steadily by ulceration, destructive cauterization may be necessary. In this case nitric acid or the acid nitrate of mercury should be used, and should be carefully applied to the surface of the sore, the surrounding healthy tissue being protected by oiled cotton. Antiseptic fomentation should follow.

Gangrenous or phagedenic chancres require similar treatment. Among dry powders *iodoform* still holds the first place in my estimation, and may be used pure, or mixed with powdered boric acid or starch.

Calomel, mixed in equal quantities with lycopodium or with powder, is a fairly satisfactory local remedy.

Burtze has used *dermatol* (bismuth subgallate) in seventy cases of soft and hard chancres, and in open buboes. The salt was used either in powder, twice daily, or in the form of a ten or fifteen per cent vaseline ointment in cases of very flabby and deep ulcers. His results were favorable. The advantages claimed for this bismuth salt are: (1) It induces far more rapid healing and cicatrization than iodol or naphthalin; (2) it never irritates the surrounding skin; (3) it is quite free from unpleasant smell and toxic effects; (4) it is relatively cheap.

Bovero also reports numerous rapid cures of balano-posthitis and syphilomata from the application of *dermatol*.

Guntz highly recommends *aristol* as a substitute for iodoform. It should not be used in the form of an ointment, but should be applied directly to the wound. It is insoluble in water, but forms a tough brown paste with olive oil, which, however, is difficult of application. The undissolved powder is inert. In applying it, therefore, the sore should be strewn with the powder, and a drop of olive oil allowed to fall on it from a glass rod; without waiting for it to dissolve, it should be covered over with some thin impermeable substance, under which the solution takes place slowly. No cotton or charpie should be applied to the ulcer. The dressing should be renewed twice daily. Its advantages are said to be its painlessness, odorlessness, and nonirritating properties. Painful

ulcers become painless after its use. If, however, as in the case of torpid ulcers the tendency to healing is not sufficiently rapid, recourse must be had to iodoform. It is of especial value in secondary lesions, in ulcerating gummata, tubercular syphilides, etc.

The Syphilides.—*The Erythematous Syphilide* usually requires no local treatment. It may exceptionally be persistent and conspicuous enough to demand some special medication. In that event the following formulæ will be found useful:

℞ Hydrarg. chlorid. mit. 3j
 Unguent. zinci oxidi,
 Unguent. petrolei carbolat. āā ʒ ss.
 M. Ft. ung. S. Apply.

℞ Hydrarg. chlorid. mit.,
 Pulv. amyli āā ʒ j
 M. et S. Dust lightly over the parts affected.

The Papular Syphilides.—These are often obstinate, and may usually be much benefited by (1) vapor baths, (2) inunctions with the simultaneous use of massage (Balzer), and (3) ointments containing mercury in one of the following formulæ:

℞ Ung. hydrarg. nitrat.,
 Ung. petrolei carbolat. āā ʒ ss.

℞ Hydrarg. ammoniat. ʒ j
 Unguent. aquæ ros. ʒ j

If they are of the papulo-squamous variety, the above ointments are especially useful. If they involve the hand, where they are so apt to be persistently recurrent, the local vapor bath proposed by Wells (Medical Record, May 13, 1891) is sometimes very useful. I have tried it in a few cases with excellent result. A hole is cut in the side of an inverted hat-box, through which the affected hand can be inserted. The interior is then filled with the vapor of calomel by means of an alcohol lamp beneath a tin tripod, on which the mercurial is sprinkled.

Mucous Patches.—So far as concerns the mouth—the most frequent seat of these troublesome manifestations—the prophylactic treatment is that which is appropriate for the prevention of ptyalism, and has already been considered (see p. 745). If the patches appear they may best be healed by the application two or three times daily of silver nitrate, five to twenty grains to the ounce, and the employment of some antiseptic and detergent mouth-wash. I frequently use the following:

℞ Acid. boric.,
 Acid. tannic. ʒ ʒ ij
 Mcl. ros. ʒ fij
 Aquæ ʒ fvj
 M. S. Use as a mouth-wash.

Sprays of listerine, or of Dobell's solution, or of hydrogen peroxide, may be employed. Sometimes a sublimate wash is of much advantage.

℞ Hydrarg. bichlorid. gr. j
 Mel. ros. f $\frac{3}{4}$ ij
 Aquæ f $\frac{3}{4}$ vj
 M. S. Use as a mouth-wash.

A diluted tincture of iodine is sometimes a useful application.

Mauriae gives the following formulæ for use in ulcerative throat lesions :

℞ Cinnabar. gr. xv
 Hydrarg. iodidi vir. gr. vijss.
 M. S. For one fumigation lasting twenty-five minutes.
 ℞ Hydrarg. iodidi vir. 3 ss.
 Carb. lig. $\frac{3}{4}$ jss.
 Benzoini gr. vijss.
 Aquæ q. s.

M. Ft. trochisci no. xx.

S. One to be burned morning and night and the vapor inhaled.

Nothing in the way of treatment will be satisfactory if the patient is careless about the use of the toothbrush, neglectful of the general condition of the mouth and teeth, or if he is an habitual smoker. Of course, the chewing of tobacco is equally harmful.

Condylomata, if vegetating and exuberant, should be cauterized with nitric acid, acid nitrate of mercury, or chromic acid. The latter two should be used with special caution, as the application of the mercurial solution has been followed by salivation, and chromic acid has caused death. (See a paper in which I reported a case of this character, Univ. Med. Mag., October, 1889.)

Another method of destroying the acuminate condylomata, recommended highly by Tsehernomordik, is the use of caustic lead. In the following form he has seen it, as a rule, destroy them down to their base, a single application being usually sufficient. In some cases, however, it must be repeated twice or thrice at intervals of two or three days.

℞ Plumbi oxidi gr. iv
 Liq. potass. caust. (33 per cent) ℥ cxvj
 M. S. Caustic; for external use only.

The remaining surface is dusted with iodoform, and a cicatrix forms in from three to ten days.

Bumstead and Taylor use in these specific as well as in nonspecific vegetations the following modification of an old formula :

℞ Acidi salicylici,
 Ext. cannabis Indica āā gr. xxx
 Collodion (flexible) $\frac{3}{4}$ j. M.

This should be painted on after careful drying.

In mild cases of condylomata absolute cleanliness and dryness and dusting with calomel powder usually bring about a cure.

Pustular and Pustulocrustaceous Syphilides.—These lesions are especially benefited by sublimate baths (see p. 785), vapor baths (see p. 784), and by the calomel and zinc ointment (see p. 803). The latter may be used on the face at bedtime. If the exudation about the base of the pustules is extensive and the crusts are thick and adherent, the following ointments will be found useful:

℞ Hydrarg. bichlorid.	. . . . .	grs. ij
Unguent. hydrarg. nitratis,		
Ung. petrolei carbolat.	. . . . .	āā ʒ ss.
℞ Hydrargyri oxidi rub.	. . . . .	3 ij
Unguent. zinci oxidi	. . . . .	3 vj

Tubercular Syphilides, Gummata, and Periosteal Nodes, when non-ulcerated, may best be treated locally by the continuous application over their surface of the following ointment spread on a piece of lint:

℞ Ung. iodini comp.	. . . . .	3 j
Ung. belladonnæ	. . . . .	3 ij
Ung. hydrarg.	. . . . .	3 iij
Ung. petrolei carbolat.	. . . . .	3 iv

If ulceration has occurred, they may be curetted and treated according to general surgical principles.

Dotchevsky warmly recommends the following as a simple and efficacious method of treating obstinate syphilitic ulcers of the leg: The ulcers are first washed out with an antiseptic solution, carbolic or sublimate. The surface is then dried by absorbent cotton and afterward tightly covered by a piece of mercurial plaster. In the beginning of the treatment this should be repeated daily, later on every other day, and ultimately every third or fourth day. The patient remains up and about during the treatment. On the first day the edges of the ulcer are found considerably congested. In a few days the surfaces become studded with bright red succulent granulations. Small ulcers heal in a fortnight, large ones in a month or six weeks. It is necessary that the plaster should be about four times as large as the ulcer and about one tenth of an inch thick. If the discharge is profuse, the surface should be powdered lightly with iodoform before applying the plaster.

The plaster used by this author is the emplastrum hydrargyri vel mercuriale, which contains twenty per cent of metallic mercury, with the addition of turpentine, colophony, etc.

Visceral or Bone Syphilis rarely affords much opportunity for local treatment, but as a rule indicates the vigorous employment of the mixed treatment.

Basing his practice upon the theory that there is often a disturbance of the reflex centers in certain specific affections, as, for example, those of the larynx or the brain, and that the comparatively slight lesions there

found do not justify the belief that they are alone the cause of all the observed symptoms, Augagneur has used *the bromides* in combination with the iodides, believing that they control the reflex nervous symptoms, and claims to have found great benefit from so doing.

The cephalalgias of the tertiary period are as happily influenced by it. The ordinary mixed treatment relieves these symptoms, but there is an apparent pathological residue which that treatment seems unable to overcome. The dose required is not over three grammes (gr. xlv) in twenty-four hours, and he believes this treatment in combination with the mixed will overcome the cerebral and nervous irritability that is so frequently the consequence of syphilitic disease.

Daizens, acting upon the theory that the iodides of sodium and ammonium are much more soluble than the iodide of potassium, and will therefore be first eliminated by the kidneys, and will occasion the detention of the last-named salt within the system, believes that he has found a method of enhancing the value and efficiency of the iodides. The following, used in a case of intense headache and ozaena, gave great relief :

℞ Ammon. iodidi,
Sodii iodidi,
Potass. iodidi āā $\frac{3}{4}$ ss.
Hydrarg. iodi. rubr. gr. $\frac{1}{4}$
Aquæ f $\frac{3}{4}$ vj

M. et S. Two teaspoonfuls in water three times daily.

Syphilitic Affections of the Eye and Ear belong to the specialists in those departments, and should usually be treated by them.

The Influence of Erysipelas on syphilitic lesions has been noted by M. Costella (Giornale Ital. dell. mal. Venere, etc., July, 1886) and M. Molnar (Oest. med. chirurg. Presse, 1887, No. 9):

The first case was one of inherited syphilis in a girl of twenty-one, who had certainly suffered to an unusual extent from disease of the joints; both knees, one shoulder, and both elbows had been the subject of chronic synovitis, in the last case leading to ankylosis. There was much enlargement about the epiphyseal lines, many subcutaneous gummata, and large ulcers over both shoulders. The spleen and liver were also enlarged. During her treatment in the hospital by sublimate injections and iodide of potassium she passed through two attacks of erysipelas, each of which appeared to have the most beneficial effects upon the syphilitic lesions. The ulcers healed, the liver and spleen returned to their normal size, the swelling about the joints subsided, and the patient gained very considerably in weight. While of course attributing this improvement largely to the treatment, M. Costella believed that the erysipelas hastened the recovery materially. Its remarkable effect upon chronic ulceration due to inherited syphilis has been observed frequently; in fact, we knew of one case which was sent into an erysipelas ward in order to be inoculated, and in whom the experiment was very successful.

M. Molnar's case was one of acquired syphilis (in the secondary stage) in

which the patient had an extensive ulcer over one parietal bone with necrosis. While in the hospital for his syphilis he contracted erysipelas of the head, the attack leading to marked improvement of the ulceration, which ultimately cicatrized.

THE TREATMENT OF HEREDITARY SYPHILIS.

The treatment of inherited syphilis may be considered: 1. In relation to the prophylactic treatment of the parents, before conception; 2, the treatment of the mother during pregnancy; and, 3, that addressed to the child *in utero* and after birth.

1. The *prophylactic treatment* is, in general, the treatment of the individual, and has been already described, but is here employed with special reference to the suppression of active syphilis during the period before conception and with increased attention to the rules of hygiene applicable to the sexual relations.

Perhaps the most important prophylactic treatment which the physician can employ has reference to the date of marriage of syphilitics. It would not be proper to discuss that subject at much length here, but I may venture to refer the reader to my article on Hereditary Syphilis in the American System of Medicine (vol. ii, p. 254) for a statement of my views. I desire to say now, however, with the fullest possible emphasis, that I believe the doctrine that it is proper to permit the entrance of a syphilitic into conjugal relations two and a half years after infection is dangerous, and is not warranted by the general experience of syphilographers and of the profession. I have had no small number of patients who have married within those limits, contrary to my advice or because marriage was for some reason imperative, and a large proportion of these have had healthy children, their wives remaining uninfected. The minority, however small, must nevertheless be considered, and that there always will be such a minority composed of syphilitic parents and children, if the above rule is carried out, I am firmly convinced.

It is far better to make the earliest period at which marriage may take place, with the full consent and approval of the physician, four years, and to let the patient take the responsibility if he or she marries sooner. Active treatment of the syphilitic husband, especially during such times as he is having periodical cohabitation with his wife, is of much importance in prevention.

2. *The treatment of the mother*, whether previously syphilitic, or having conceived by a syphilitic husband, or having contracted the disease after impregnation, is simply the treatment of acquired syphilis in any person. Mercurv in full physiological doses is the drug indicated. It may not be amiss to combine with it iodide of potassium in moderate doses, but the practice of employing the latter to the exclusion of the

former is both theoretically and clinically unsound. Care should be taken to give the mercury in such a manner that it shall not produce any irritating effects on the intestinal canal, whether guarded with opium, by inunction, vaporization, or injections. The advantages of each method have been discussed under their appropriate headings. In all medication great care should be taken not to produce purging, as the intimate relation existing between the alimentary canal and the uterus may lead to abortion.

That the treatment of the mother is beneficial both to herself and to the child is beyond all doubt, and if it fails by one method another should be tried; but I have confidence that the administration of mercury by the mouth (and of iodide of potassium when indicated) will be found of just as much value in the pregnant syphilitic woman as in the same woman not pregnant, though Taylor says that that form of medication is "utterly futile." My own experience leads me to depend upon it, and, I think, justifies me in recommending it, under the limitations mentioned above, and with inunctions as an occasional adjuvant.

3. Abner Post (*Cyclopædia of the Diseases of Children*, vol. ii, p. 211) says very properly :

"A question that often presents itself at the very outset is as to the propriety of commencing treatment of a babe apparently healthy, but born of syphilitic parents. Parrot would await manifestations, but would commence treatment in the absence of external manifestations, when there existed obstinate intestinal affections not due to athrepsia."

He then quotes the well-known rules of Fournier as to treatment from birth as follows :

1. An infant born healthy, in appearance at least, of a syphilitic father, need not be treated. One knows that paternal heredity is much less certain than maternal heredity; consequently the infant has chances of having escaped the syphilis.

2. A child born healthy, in appearance at least, of a mother formerly syphilitic, and who has not shown any accidents of syphilis during her pregnancy, need not be treated, since, if there are chances of its being syphilitic, there are also chances of its not being so.

3. A child born healthy, in appearance at least, of a woman recently syphilitic—above all, if she has had venereal accidents in the course of her pregnancy—ought to be treated energetically from its birth, since it is certain, in spite of all appearances to the contrary, that it is syphilitic, and that its latent syphilis may declare itself at any moment and give rise to grave and even fatal accidents.

Since the pathology, the stages, and the general course of hereditary syphilis are all closely related to or identical with the same phenomena in the acquired disease, and we know that they both depend upon the same

ultimate cause, it is logical to use in the treatment of the one the same principles that govern us in the other.

We know that clinical experience teaches us that mercury exercises an almost controlling influence over the secondary manifestations of acquired syphilis. We know also that the iodide of potassium, probably by its powerful stimulating action on the lymphatic system, has an equal power over the tertiary growths. In hereditary syphilis there are, however, two elements that should modify the treatment somewhat, and must be taken into consideration. These are: 1. The existence of a more or less profound cachexia influencing all the nutritive and formative processes, and in itself, aside from any definite specific involvement of vital organs, threatening life. 2. The not infrequent occurrence during the secondary period of symptoms—notably gummata—belonging to the tertiary stage.

The first indication is met by making the treatment from first to last not only antisiphilitic, but also supporting and even stimulating; and with this object in view special attention should be paid to nutrition. It may be stated axiomatically that for every reason, whenever it is within the bounds of possibility, the nurse of a syphilitic child should be its mother. To her it is harmless; to every other woman, not already syphilized, it is in the highest degree dangerous. If neither mother nor wet nurse can be had to suckle the child, it must be fed on cow's, goat's, or ass's milk, or by artificial alimentation; but its chances of life will be immeasurably reduced. In addition to careful feeding, a little tonic treatment should be employed from the beginning in conjunction with the specific remedies, iodide of iron, cod-liver oil, and preparations of phosphates being the most useful drugs. The chance of tertiary symptoms appearing in the secondary stage leads us to combine with the mercurial treatment from the first small doses of the iodide of potassium, or some other soluble and easily decomposed salt of iodine.

These principles of treatment being recognized, the routine procedure may be thus described: Give mercury as soon as the diagnosis of syphilis is assured, preferably by inoculations. Sir Benjamin Brodie's opinion, expressed many years ago, still represents that of the majority of the profession: "I have tried different ways of treating such cases. I have given the child gray powder internally and given mercury to the wet nurse. But mercury given to the child by mouth generally gripes and purges, seldom doing any good, and given to the wet nurse it does not answer very well, and certainly is a very cruel practice. The mode in which I have treated cases for some years past is this: I have spread mercurial ointment, made in the proportion of a drachm to an ounce, over a flannel roller and bound it around the child once a day. The child kicks about, and, the cuticle being thin, the mercury is absorbed. It does not either gripe or purge, nor does it make the gums sore, but it cures the disease. I have adopted

this practice in a great many cases with signal success. Very few children recover to whom mercury is given internally, but I have not seen a case where this method of treatment has failed."

The treatment of infantile syphilis by the use of hypodermatic injections of mercurial salts has recently been adopted by some syphilographers. The advantages claimed for it are summed up by Moncorvo and Ferreira as follows: 1. The hypodermatic method must hereafter be included among those used in hereditary syphilis. 2. Among the various mercurial preparations employed, preference should be given to gray oil among the insoluble salts, and to corrosive sublimate among the soluble. 3. The injections of both preparations are perfectly well borne and are notably beneficial. 4. The injections should be preceded by careful antiseptic measures, an interval of four days being the one advised. 5. The results obtained are favorable, and their efficiency is in no degree inferior to other modes of treatment. 6. Cutaneous syphilides, gummata, etc., are more quickly influenced by mercurial injections, but glandular affections are more slowly acted upon. 7. As a general mode of treatment the hypodermatic use of mercurials is well borne by infants, and is free from the ordinary accidents, such as salivation, stomatitis, intestinal disturbance, etc.

I should say, however, that a careful perusal of their paper fails to inspire me with a feeling of confidence in these claims.

When for any reason, as irritation of the skin, either or both of these modes are contraindicated, treatment by the mouth must be resorted to, and probably the best formula to employ is the following:

℞ Hydrarg. cum creta gr. j-vj
 Sacch. alb. gr. xij
 M. et div. in chart no. xij.
 Sig. One powder three times a day, to be taken soon after nursing.

Bumstead and Taylor have used in many cases with great benefit the following:

℞ Hydrarg. biniodidi gr. j
 Potass. iodid. ʒ iv
 Syr. sars. comp.,
 Aquæ āā ʒ ij. M.

Of this mixture a child one month old may take five drops thrice daily, increasing the dose by a drop every five days. To a patient over five years of age half a teaspoonful may be given, the dose being gradually increased to one or one and a half teaspoonfuls.

Externally, at the same time, a mild mercurial ointment may be used, or, better, the following may be kept in contact with the skin under pressure:

℞ Ung. hydrarg.,
 Ung. zinci oxid. āā $\frac{3}{4}$ ss.
 Bals. Peru 3j. M.

In conjunction with the internal use of the powders of mercury with chalk, iodide of potassium may be given in a sirupy solution, as also in conjunction with the use of inunctions, in doses varying from half a grain to a grain, or, if there be any marked tertiary symptoms, even in much larger doses, three or four times daily. The treatment, no matter in what form, should be continued long after the disappearance of syphilitic symptoms, and it would be well to continue the mixed treatment till after puberty. In all cases, as in the treatment of adult syphilis, in addition to the medicinal treatment special attention should be paid to cleanliness and hygiene, with life out of doors and healthy, invigorating food. It may be useful to mention in outline the treatment recommended by two or three additional authorities:

Simon (*Journal des Maladies Cutanées et Syph.*, No. 5, 1891) recommends for an infant of five or six weeks the liquor of Van Swieten, as preferable to other preparations, in the dose of fifteen to twenty drops per day, taken in three or four divided doses. Mercurial frictions can be applied at the same time in the armpits.

The following formula is given:

℞ Neapolitan ointment 3j
 Lanolin 3iij
 Mix and divide into six doses, wrapped separately in paraffin paper.

Each day one is used for a friction in the axilla, and after from two to four days a tepid bath is given.

Widerhofer employs the following ointment upon the sides of the nose in cases of "snuffles":

Red precipitate gr. ij
 Lanolin ℥ viij

This is to be applied by mild frictions in quantity equal to that of a pea. This mode of application has the advantages of diminishing the swelling of the mucous membrane of the nose, when it exists, thus permitting the infant to take the breast more readily.

Simon thinks corrosive sublimate baths are useful, especially in rebellious cases which do not give way to the means above referred to. They must be repeated every three days, and during the immersion care must be taken to prevent the infant from swallowing any of the toxic fluid.

The following is the formula for each bath:

Corrosive sublimate gr. iv
 Hydrochlorate of ammonia gr. xv
 Distilled water f $\frac{3}{4}$ iv

If the infant is over six months of age, and is raised on the bottle, the milk can have Gibert's sirup added to it, a third of a teaspoonful in divided doses during the twenty-four hours (*Journal of Cutaneous and Genito-Urinary Diseases*, vol. ix, 1891, p. 315).

Starr (Medical Chronicle, May, 1890) gives the following advice: Should one or two children in a family be born syphilitic, and another be expected, it is always advisable to treat the mother for the specific disease. If the child be born apparently healthy, antisyphilitic treatment must be begun at once. He prefers the mercurial treatment from the outset. Mercury may be administered by the mouth, by baths, or by inunction. By the mouth, one $\frac{1}{120}$ grain of corrosive sublimate may be given three times a day, or $\frac{1}{12}$ grain of calomel thrice daily; or, again, one grain of mercury with chalk three times daily, gradually increasing each dose to two grains. The last is less apt to disturb the stomach or the intestines than either of the former.

Mercurial baths should be used every two, three, or four days, unless erythema be produced by their employment. Each bath at first contains half a drachm of corrosive sublimate, the quantity being increased fifteen grains at a time, until finally a drachm or a drachm and a half be reached. Personally he prefers inunction. Fifteen grains to half a drachm of mercurial ointment should be rubbed into the skin daily, a different portion of the body being selected each day in order to minimize irritation; or it may be smeared on the child's binder, its natural movements being sufficient to rub it into the skin. Iodide of potassium is useful when there is bone trouble with nocturnal pains, and in the nervous affection may either be used alone or in combination with mercury.

Various local treatments are necessary. In cases of coryza, keep the nose clean by syringing with salt and water (one drachm to one pint) twice daily. Touch the nasal membrane every other day with a weak solution of nitrate of silver (five grains to one ounce), or blow into the nostrils thrice daily a powder composed of boracic acid twenty grains to forty grains of bismuth subnitrate.

Ulcers of the lips should be touched with the solid stick of silver nitrate, followed by the application of the dilute citrine ointment, or the ointment of the ammoniated mercury one half the officinal strength. Patches on the skin are to be cleansed with salt and water, and then dusted with calomel. For the eruption simply apply the nitrate or ammoniated mercurial ointment.

The *indirect treatment* of the child through the milk of the mother or the nurse has an interesting literature well summarized by Taylor (*op. cit.*), the evidence being in favor of the view that both mercury and potassium iodide, given in this way, are of some value, especially the former, and that the method is one of possible utility in cases where other plans of treatment have failed or must be temporarily interrupted.

The *local treatment of the mother* during pregnancy is held by Angagneur to be of the highest importance. Free antiseptic disinfection must be used from the first, with sublimate and boric-acid solutions, but care must be taken not to apply solutions too strongly or too freely. The humidity of the parts during pregnancy may cause accident. Hypertrophic lesions of the vulva must be carefully treated, and a powder of ten parts of boric acid to twenty of tale is the best to keep the parts dry. Without treatment, condylomata grow rapidly in pregnancy, and may cause complications.

SYPHILIS IN RELATION TO PUBLIC HEALTH.

By SAMUEL TREAT ARMSTRONG, M. D.

THE relation that any disease bears to the public health is in a direct ratio to its prevalence and to its preventability.

Upon the latter depend the measures that must be adopted to secure the limitation of the manifestation of the disease by means of the isolation of affected persons and their proper treatment, together with such sanitary measures as may seem necessary, or that experience has taught to be desirable, to conserve the health of the associates of those that are affected. In elaborating any plan to attain these ends it is necessary to base all action upon the evidence that is afforded by the frequency with which the disease occurs, and this latter is largely influenced by the particular classes of society in which it is met with. As subsidiary but still important features, it is desirable to determine whether men or women are the more frequently affected; what the influence of the disease may be upon the birth-rate of the nation; and what its influence is upon the death-rate.

A study of syphilis, therefore, in relation to public health entails a consideration of the danger of syphilis in regard to the individual. This necessitates the determination of the proportion of persons affected by syphilis; the incapacity that is the consequence of the disease, including the economic factors of the loss of time and of wages; and the influence that syphilis exercises on health and on longevity, these latter being of further interest and importance in the relation they bear to life insurance.

It will be further necessary to consider the danger of syphilis in regard to others; this would include a consideration of the various ways in which people may extra-sexually acquire syphilis, as well as a consideration of syphilitic infection by marriage. This latter topic would include also a study of the relation the disease bears to the birth-rate as well as a study of the charge imposed on the community by the diseased offspring of syphilitic parents.

Finally, it would be desirable to consider the disease in its general relation to the community, as well as its effects on races and on nations, and the means to be adopted for its control.

Value of Statistics.—That “the literature of syphilis is encumbered with ill-founded opinions and untrustworthy facts” no one that is conversant therewith will venture to deny. And perhaps regarding no portion of that subject are vague ideas and misleading statistics more frequently encountered than in those publications that consider the relation of syphilis to public health. The gamut of the theme runs from the benignity to the malignity of that disease, either partisan presenting what seems to him to be satisfactory evidence of the tenability of his position, while a flood of literature gives us the statistics of some particular medical service; ignoring, as a rule, any consideration of the proportion that these particular cases bear to the total number of cases of all the diseases treated. Interesting as may be the statistics of syphilitic cases treated in some institution devoted almost exclusively to the treatment of cutaneous and venereal diseases, they only suffice to inform us regarding the proportion such cases bear to the general total of those diseases; and to ascertain the proportion that syphilitic bear to general diseases, it becomes necessary to consult the statistics of hospitals that treat all kinds of diseases.

Statistics of General Hospitals.—Here our research is confronted by the fact that general hospitals, as a rule, take but few patients suffering from syphilis; the illogical position being maintained that such patients are affected by a disease that has been acquired in consequence of their own viciousness, and that, as a hospital can not afford relief to all that apply therefor, these cases are best refused. Thus, in the reports of the Massachusetts General Hospital for the years 1879 to 1887 inclusive, it may be found that from four to twelve per cent of the total number of persons refused admission were suffering from syphilis. The annual reports of St. Luke’s Hospital, New York city, show the number of cases of men and women suffering from syphilis that were treated in that institution, as well as the diseases from which those refused admission were suffering. From Table I it may be seen that from three to fifteen times as many syphilitic patients were refused treatment as were treated for that disease. And from this hospital, here cited because its reports happened to be most convenient, we may judge the action of most if not of all similar institutions.

TABLE I.

Per Cent of Syphilitic Patients treated and refused Treatment, St. Luke’s Hospital.

YEAR.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.
Per cent of syphilitic patients treated.....	0·8	0·7	0·9	1·0	1·2	1·1	0·8	1·3	1·3	1·8
Per cent of syphilitic patients among those refused	6·0	4·8	4·8	15·4	18·0	4·0	4·4	5·0	5·4	4·5

Another disadvantage that is encountered by those seeking statistical evidence upon this subject is, that many reports include under the caption "venereal diseases" all forms of venereal disease as well as syphilis. This has made it impossible to take advantage of many reports of which it would have been desirable otherwise to make mention.

Statistics of the United States Marine Hospital Service.—

It has seemed possible that fair deductions regarding the general prevalence of syphilis might be obtained by taking a series of reports, as those of the United States Marine Hospital Service, in which there were records of a large number of diseases, and ascertaining therefrom the proportion that syphilis bore to the total number of cases treated. Then, with army and navy statistics, it would be possible to determine the frequency with which that disease occurred among selected healthy men, and the mortality that it caused. Finally, taking the mortality statistics of some large city, the proportion that the syphilitic mortality bore to the general mortality could be learned, and by comparison with the figures obtained by the two foregoing methods an approximation might be attained of the number of cases of that disease that existed in a community. In several of the tables that have been compiled for this paper it will be noticed that statistics of ulcer of the penis, a purely nonspecific lesion, are included. The reason for this is that, previous to 1886, when the new edition of the Nomenclature of the Royal College of Physicians was published, it was not infrequently the case that hard chancres were included under the caption of ulcer of the penis; consequently, for the purpose of comparison, and to exclude this source of error, the statistics for the latter disease are included in the tabulation.

From the statistics of the United States Marine Hospital Service for the decade 1881 to 1890 inclusive, given in Table II, it may be learned that in a number of patients, ranging from thirty-two to fifty thousand a year, the number of cases of primary syphilis varies from three to five and two tenths per cent; that of secondary syphilis varies from twelve and one tenth to fifteen per cent; while the percentage of deaths due to syphilis to the total mortality varies from one to two and three tenths per cent. When these statistics are further analyzed, a difference is found between the frequency with which these forms of syphilis occur in hospital and in dispensary patients. In the former class the percentage of primary syphilis varies from one to three, while among dispensary patients it varies from one and one tenth to two and two tenths per cent; and secondary syphilis in the former class varies from four and five tenths to six and four tenths per cent, while in the latter class it varies from seven and two tenths to eight and six tenths per cent. The average annual percentage of cases of primary syphilis among hospital patients is 1.94, and among dispensary patients it is 1.58; the average annual percentage of

eases of secondary syphilis in the former class is 5.29, in the latter 7.77. Notwithstanding the wide variation in the number of patients treated annually, an inspection of the table shows the close relationship sustained between the percentage of cases of primary and of secondary syphilis. A calculation of the mean and of the probable error gives the following figures :

Hospital patients :	primary syphilis, mean error.....	0.51
“ “	“ “ probable error.....	0.34
“ “	secondary syphilis, mean error.....	0.275
“ “	“ “ probable error.....	0.182
Dispensary patients :	primary syphilis, mean error.....	0.47
“ “	“ “ probable error.....	0.31
“ “	secondary syphilis, mean error.....	0.34
“ “	“ “ probable error.....	0.22

This calculation further justifies the selection of these statistics, for the variation of error in the hospital and dispensary cases is some hundredths of one per cent, notwithstanding the fact that the cases are observed by a number of physicians, and the opportunity for error due to “the personal equation” are correspondingly multiplied.

In 1881, 9.7 per cent of the total patients treated were suffering from syphilitic diseases ; in 1882, 8.8 per cent ; in 1883, 8.2 per cent ; in 1884 and 1885, about 7.6 per cent ; in 1886, 8.3 per cent ; in 1887, 1888, and 1889, about 9.2 per cent ; and in 1890, 8.4 per cent. In other words, among a number of thousands of patients coming from a class of society supposed to be particularly susceptible to venereal diseases, less than ten per cent of the total number of patients treated were suffering from the various forms of syphilis. These percentages show no tendency to an increase or to a decrease of the disease during successive years, and their range of variation is so moderate that the mean and probable error of each year is about one per cent. Another factor that is to be considered is, that there is absolutely no more restriction imposed upon these men than there is upon the members of the community at large.

The mortality rate in Table II has been calculated on the ratio that the deaths from syphilis bear to the total number of deaths from all diseases, and the average for the decade is 1.84 per cent ; or in ten thousand deaths from all causes in this class of our population, one hundred and eighty-four deaths will be caused by syphilis. Still, this mortality from the disease during the decade specified was but eighty-four hundredths of one per cent of the cases of syphilis treated in the hospitals ; and as only the severe cases seek hospital treatment, the percentage would be greatly reduced if the calculation of the mortality percentage was based on the number of cases of syphilis treated in the hospitals and dispensaries.

TABLE II.

Venereal Statistics, United States Marine-Hospital Service.

HOSPITAL PATIENTS.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Average number of days in hospital.	Deaths.
1881: In hospital.....	1,116	284	804	25.3	8
Per cent of total	9.0	2.2	6.4	....	2.0
1882: In hospital.....	1,054	257	677	26.2	5
Per cent of total.....	8.0	2.0	5.1	....	1.0
1883: In hospital.....	1,098	197	690	24.7	11
Per cent of total.....	8.2	1.4	5.1	....	2.0
1884: In hospital.....	973	156	650	25.2	10
Per cent of total.....	7.4	1.1	4.9	....	2.0
1885: In hospital.....	827	135	583	25.3	9
Per cent of total.....	6.4	1.0	4.5	....	2.3
1886: In hospital.....	331	278	626	25.1	5
Per cent of total.....	2.6	2.2	4.9	....	1.3
1887: In hospital.....	234	405	660	25.1	7
Per cent of total	1.7	3.0	5.0	....	1.7
1888: In hospital.....	340	367	805	25.3	9
Per cent of total.....	2.4	2.6	5.7	....	2.0
1889: In hospital....	343	299	777	26.9	10
Per cent of total.....	2.5	2.1	5.8	....	2.1
1890: In hospital.....	322	263	809	27.1	9
Per cent of total.....	2.2	1.8	5.5	....	2.0

DISPENSARY PATIENTS.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.
1881: Number.....	1,117	331	1,751
Per cent of total.....	5.5	1.6	8.6
1882: Number.....	1,397	374	1,902
Per cent of total.....	6.4	1.6	8.2
1883: Number.....	1,461	403	2,125
Per cent of total.....	5.4	1.5	7.9
1884: Number.....	1,503	382	2,370
Per cent of total.....	4.7	1.2	7.4
1885: Number.....	1,213	320	2,228
Per cent of total.....	4.2	1.1	7.7
1886: Number.....	853	537	2,269
Per cent of total.....	2.7	1.7	7.2
1887: Number.....	840	737	2,496
Per cent of total.....	2.6	2.2	7.7
1888: Number.....	966	690	2,513
Per cent of total.....	2.8	2.0	7.3
1889: Number.....	975	631	3,001
Per cent of total.....	2.7	1.7	8.3
1890: Number.....	1,015	448	2,773
Per cent of total.....	2.8	1.2	7.6

With these statistics of a class of men whose sanitary environment is subjected to no medical restriction we may compare the records of the army and navy, wherein the men have constant medical supervision, for the same period.

Statistics of the United States Army.—The army statistics, for which I desire to express my obligation to Surgeon-General C. Sntherland, are presented in Table III.

TABLE III.
Venereal Statistics, United States Army.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Inval- lided (dis- charged).	Deaths.	Average number of days in hospital.
1881: In hospital.....	*	616	491	120	2	†
Ratio per M....	....	24.2	19.3	4.7	..	....
1882: In hospital.....	....	467	466	100	..	....
Ratio per M....	....	18.7	18.7	4.0	..	....
1883: In hospital.....	....	487	348	106	2	....
Ratio per M....	....	19.2	13.7	4.1	..	....
1884: In hospital.....	....	407	311	83	1	....
Ratio per M....	....	15.5	11.9	3.1	..	....
1885: In hospital.....	194	†	604	89	..	....
Ratio per M....	7.2	....	22.7	3.3	..	....
1886: In hospital.....	150	....	527	85	..	....
Ratio per M....	5.7	....	20.3	3.2	..	....
1887: In hospital.....	210	....	548	96	..	} 33.4
Ratio per M....	8.0	....	20.9	3.6	..	
1888: In hospital.....	299	....	550	83	1	} 31.5
Ratio per M....	11.2	....	20.8	3.1	..	
1889: In hospital.....	318	216	336	80	..	} 32.6
Ratio per M....	11.6	7.9	12.3	2.9	..	
1890: In hospital.....	282	†	478	64	..	} 31.4
Ratio per M....	10.8	....	17.8	2.3	..	

The tabulation of ulcers of the penis (chancreoids) with primary syphilis previous to 1885, and of primary with secondary syphilis subsequent to that year, except during 1889, introduces an unfortunate element of confusion. The number of cases of primary syphilis per thousand of strength, from 1881 to 1884 inclusive, averaged 19.4, while the number of cases of ulcer of the penis during 1885 to 1890 averaged 9.0 per cent. By a calculation of the difference of these two percentages, and of the differences of the percentages of secondary syphilis previous and subsequent to 1885, it is ascertained that the average number of cases of primary syphilis during 1885 to 1890, excepting 1889, is 7.5 per thousand, while previous to 1885 the average was ten per thousand of strength. Making the necessary allowances for the years during which cases of primary syphilis were tabulated with those of secondary syphilis, it is found that during the decade there was an average of fourteen men in every thousand of mean strength that acquired secondary syphilis, and the number of men that lost their occupation—that is, that were dis-

* Previous to 1885 ulcers of penis were tabulated with primary syphilis.

† For the years 1885 to 1888 inclusive, and for 1890, the heading "syphilis and results" was used instead of the separate headings, "primary" and "secondary syphilis."

‡ Days lost on account of sickness were not tabulated until 1887.

charged from the service because they were syphilitic—averaged 3·4 per thousand of strength. This latter percentage shows that about one fourth of the men affected with syphilis became, in the opinion of the medical officers, unfit for the vicissitudes of military service.

Statistics of the United States Navy.—With considerable difficulty, and not without assistance from the Surgeon-General's office, the chronology and variability in the tables in the Annual Reports of the Surgeon-General of the Navy were mastered and Table IV was prepared. Syphilis seems to be a far greater scourge to the American sailor than to the American soldier, although it is not an unjustifiable presumption that the ranks from which both services are recruited are similar in tastes and dispositions. But the sailor is exposed to more frequent and more numerous temptations that entail the possibility of acquiring syphilis than is the soldier on the frontier. In the navy, during the decade 1881 to 1890, there was an average of 18·4 men in each thousand of mean strength that had primary syphilis, and 27·9 men that had secondary syphilis. The percentage of deaths due to syphilis was quite small; while that of invaliding is large, because it includes invaliding from ships to hospitals.

TABLE IV.

Venereal Statistics, United States Navy.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Invalided.	Deaths.	Average number of days in hospital.
1881: In hospital....	135	246	299	128	1	25·2
Ratio per M....	14·1	25·7	31·3	13·4	0·1	
1882: In hospital....	144	280	343	145	..	22·3
Ratio per M....	15·3	29·8	36·6	15·3	..	
1883: In hospital....	131	149	305	144	..	25·1
Ratio per M....	13·1	14·9	30·5	14·4	..	
1884: In hospital....	219	168	270	125	1	29·2
Ratio per M....	21·9	16·8	27·1	12·5	0·1	
1885: In hospital....	362	244	434	162	..	24·7
Ratio per M....	36·2	24·4	43·4	16·2	..	
1886: In hospital....	201	244	115	94	..	26·5
Ratio per M....	19·5	23·7	11·2	9·1	..	
1887: In hospital....	167	161	152	73	..	27·6
Ratio per M....	17·3	16·7	15·8	7·5	..	
1888: In hospital....	228	100	284	88	1	25·3
Ratio per M....	22·9	11·0	28·5	8·8	1	
1889: In hospital....	118	121	290	120	1	32·1
Ratio per M....	10·5	10·6	25·8	10·6	0·09	
1890: In hospital....	152	101	261	100	..	27·8
Ratio per M....	16·8	11·1	28·8	11·0	..	

Statistics of European and Native Armies of India.—In Table V the statistics of the European and the native armies of India are presented. From those of the former we learn that an average of 101·11 men in every thousand of strength had primary syphilis during the

decade 1881 to 1890, and 33·55 men in every thousand of strength had secondary syphilis during that time; yet in the native army an average of only 10·94 men in a thousand had primary syphilis during that decade, while but 5·47 per thousand were affected with secondary syphilis. The

TABLE V.

Admissions for Venereal Diseases, European Army of India.

(From the Annual Reports of the Sanitary Commissioner with the Government of India.)

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Invalided.	Deaths.
1881: In hospital.....	....	5,376	1,352	....	..
Ratio per M.....	....	92·0	23·1	....	..
1882: In hospital.....	....	5,013	1,327	....	1
Ratio per M.....	....	87·6	23·2	....	..
1883: In hospital.....	....	4,835	1,304	....	1
Ratio per M.....	....	87·2	23·5	....	..
1884: In hospital.....	....	4,992	1,352	....	2
Ratio per M.....	....	90·2	24·4	....	..
1885: In hospital.....	....	6,972	1,638	....	2
Ratio per M.....	....	122·1	28·7	....	..
1886: In hospital.....	2,678	7,074	2,055	....	6
Ratio per M.....	43·4	114·5	33·3	1·64	..
1887: In hospital.....	4,255	4,830	1,875	....	1
Ratio per M.....	66·6	75·5	29·4	1·60	..
1888: In hospital.....	4,798	4,941	2,218	....	4
Ratio per M.....	70·0	72·1	32·4	1·01	..
1889: In hospital.....	6,293	9,299	3,549	....	6
Ratio per M.....	90·9	134·3	51·2	1·32	0·09
1890: In hospital.....	5,769	9,198	4,497	....	6
Ratio per M.....	85·1	135·6	66·3	2·92	0·09

Admissions for Venereal Diseases, Native Army of India.

YEAR.	Ulcer of penis.	Primary syphilis.	Secondary syphilis.	Deaths.
1881: In hospital.....	2,056	822	10
Ratio per M.....	15·4	6·1	0·07
1882: In hospital.....	1,686	681	7
Ratio per M.....	13·3	5·3	0·05
1883: In hospital.....	1,495	750	5
Ratio per M.....	11·8	5·9	0·04
1884: In hospital.....	1,266	609	7
Ratio per M.....	9·9	4·7	0·05
1885: In hospital.....	1,298	678	2
Ratio per M.....	10·5	5·4	0·01
1886: In hospital.....	1,284	637	3
Ratio per M.....	9·9	4·9	0·02
1887: In hospital.....	1,024	647	8
Ratio per M.....	7·3	4·6	0·05
1888: In hospital.....	1,252	669	5
Ratio per M.....	8·6	4·6	0·03
1889: In hospital.....	619	1,464	808	7
Ratio per M.....	4·8	11·5	6·3	0·05
1890: In hospital.....	604	1,442	883	11
Ratio per M.....	4·7	11·3	6·9	0·07

Average strength: European army, over 65,000; native army, over 130,000. The contagious disease act was abrogated in 1888.

great discrepancey of figures for the same class of men, but of different races, prompts the question, does the native race enjoy its immunity on account of lessened susceptibility, or, does the large number of European soldiers affected indicate an increased susceptibility in consequence of the debilitating effects of the climate? While the latter is not an unimportant factor in influencing the severity of syphilis, it can not be held responsible for the number of cases, as may at once be seen by comparing these statistics with those of the army of Great Britain, the latter showing that the soldier is more frequently infected there than he is in India.

At first thought it was supposed that the high ratio of primary syphilis was in consequence of the inclusion of cases of ulcer of the penis with the statistics of primary syphilis; but the separate tabulation of ulcer of the penis from and after 1886 shows that this idea was erroneous. The percentage of invaliding is less than in the United States Army, while that of death resulting from syphilis is that usually recorded.

Comparison of Army Statistics.—In the Annual Reports of the Surgeon-General of the United States Army the statistics of several foreign armies are occasionally introduced for the purpose of comparing the relative frequency of disease, death, and discharge for disability. From those tables it is possible to obtain the syphilitic statistics of the British army for several years, that may be compared with the foregoing statistics of the Indian army, and that show that the high percentage of syphilis in the European forces in India is not a matter of climate. In the army of Great Britain syphilis caused per thousand of strength, in

1887:	116.39	admissions;	0.03	deaths;	0.64	discharges.
1888:	106.52	“	0.11	“	0.93	“
1889:	92.89	“	0.03	“	1.05	“

In the army of Italy it caused in

1887:	5.68	admissions;	0.01	deaths;	0.01	discharges.
1889:	8.62	“	0.01	“	0.02	“

In the army of Prussia, Saxony, and Württemberg it caused in

1886-'87:	8.74	admissions;	0.01	deaths;	0.03	discharges.
1887-'88:	6.30	“	0.0	“	0.04	“
1888-'89:	11.11	“	0.01	“	0.01	“

These latter statistics, meager though they be, serve to show that there is great divergence in different countries in regard to the frequency of syphilis, judging from the evidence that is afforded by the army medical reports; and therefore the probability that in one or ten thousand men a certain number would be syphilitic, would seem to depend upon the country in which the investigation is made. Presumably all armies are recruited by the admission of healthy men only; and it is for this reason that, in estimating the probability of the frequency of a disease in a civil

population from the data obtained from army statistics, it would be supposed that in a thousand men taken at random and observed during a year, a certain number will acquire syphilis.

Dr. Josef Schorr published an interesting paper (*Internat. klinisch. Rundschau*, Wien, 1888, vol. ii, pp. 620, 668, 761, 851, 889) on syphilis as it occurs in armies, but makes his paper practically valueless for our present purpose by introducing the statistics of venereal disease in general; though there are few if any papers on this topic in which this fault has not been committed. The average from all venereal diseases (73·37 per thousand of mean strength), during the decade 1876 to 1885, is less in the Austrian army than is that of syphilis in the English army. In Dr. Schorr's paper it is stated that the statistics of 250,589 patients treated in 592 Austrian hospitals showed that 9·68 per cent were suffering from syphilis—a percentage corroborating that determined by the statistics of the United States Marine-Hospital Service.

But there is no such similarity in the figures that have been cited to show the number of cases of syphilis that would probably appear in a thousand healthy men in a year. A further examination of the statistics above cited shows that in the

English army (average three years).....	105·3
European army in India (average ten years).....	67·5
United States navy (average ten years).....	23·5
United States army (average ten years).....	11·5
Prussia, Saxony, and Württemberg army (average three years).....	8·9
Native army in India (average ten years).....	8·3
Italian army (average two years).....	7·2

men in a thousand are suffering from some form of syphilis. Figures that show that from 7·2 men in Italy to 105·3 men in Great Britain and its colonies, in every thousand, suffer from syphilis have a range of variation that is too wide for general statistical value, though undoubtedly they indicate the prevalence of the disease in the respective countries.

Mortality Statistics of Syphilis in England.—From the reports of the Registrar General of England for the decade 1881 to 1890 we learn the mortality statistics of syphilis in males and females per million of population, as well as the number of deaths due to syphilis in one million deaths from all causes. These figures are presented in Table VI, from which it is learned that more males than females die in consequence of syphilis. In the instance of the former sex from seventy to ninety-one, with an average of eighty persons in a million, die from syphilis, while in the latter sex from sixty-four to eighty-three, with an average of 72·8 in a million, die from that disease.

The temptation to generalize from these statistics is very great, and it does not seem to be an extravagant or unjustifiable inference that their

TABLE VI.
Mortality Statistics of England.

YEAR.	No. of deaths of males per 1,000,000 popu- lation.	No. of deaths due to syphilis in males per 1,000,000.	No. of deaths of females per 1,000,000 popu- lation.	No. of deaths due to syphilis in females per 1,000,000.	In 1,000,000 deaths from all causes there would be syphi- litic deaths—
1881.....	19,997	87	17,813	75	.....
1882.....	20,676	90	18,502	79	4,310
1883.....	20,669	91	18,462	83	4,421
1884.....	20,716	89	18,473	79	4,295
1885.....	20,050	87	18,024	73	4,201
1886.....	20,341	86	18,270	74	4,152
1887.....	19,798	79	17,835	67	3,889
1888.....	18,847	70	16,806	64	3,771
1889.....	18,846	76	16,934	66	3,961
1890.....	20,836	75	18,337	68	3,657

variation is due, to an extent at least, to returns of syphilitic deaths being made under the caption of some organic lesions that are a consequence of syphilis.

If these mortality statistics are subjected to further analysis, as in Tables VII and VIII, it is apparent that the greater portion of the mortality from syphilis occurs in that portion of the population under five years of age, and of this the major portion is that of infants. Congenital syphilis is therefore largely responsible for the mortality caused by syphilis. Among males, the annual mortality of infants under one year varies from 73·7 to 79·8 per cent of the total annual mortality caused by syphilis, the average being 77·5 per cent for the decade herein recorded, while the mortality of all males under five years of age in consequence of syphilis averages but 84·35 per cent. Among females, the annual mortality of infants under one year varies from 69·6 to 74·6 per cent of the total annual mortality caused by syphilis, the average for the decade being 72·06 per cent, while that in consequence of syphilis of all females under five years of age averages 79·86 per cent of the total. And it is this first quinquennium of life that is fraught with the higher mortality in the males, for a comparison of the subsequent periods shows that the mortality from the disease in question is almost always greater among women, as may be seen from Table IX.

There is another point that may be deduced from these statistics, and that is the number of persons that are probably syphilitic in Great Britain in a decennium. There were 1,742 males over five years of age that died during that period; military statistics have shown that about one tenth of one per cent of those affected with syphilis die therefrom: so during that decade there were probably 1,742,000, or almost 175,000 males that were annually affected by syphilis. Granting that these figures are excessive because the mortality from that disease in an army is small in proportion to the number of cases, for the reason that any disability from syphilis

TABLE VII.
Mortality of Males caused by Syphilis in England.

YEAR.	All ages.	Under 1 year.	1 +.	2 +.	3 +.	4 +.	Total under 5.	5 +.	10 +.	15 +.	20 +.	25 +.	35 +.	45 +.	55 +.	65 +.	75 +.	85 +.
1881.....	1,099	845	47	10	6	4	912	2	1	9	13	40	56	32	23	8	3	..
1882.....	1,158	915	63	14	..	2	994	4	3	5	12	42	41	35	15	6	1	..
1883.....	1,180	942	58	17	5	2	1,024	2	2	3	11	36	42	32	18	10	..	..
1884.....	1,174	930	73	16	..	1	1,020	2	2	7	11	37	42	30	15	7	1	..
1885.....	1,161	904	64	12	4	2	986	6	3	1	11	46	38	32	22	14	2	..
1886.....	1,168	921	73	12	3	2	1,011	5	..	1	9	38	41	33	24	5	..	1
1887.....	1,095	861	52	5	..	2	920	4	2	2	11	38	37	38	25	14	4	..
1888.....	984	759	39	7	3	1	809	4	2	5	14	43	42	36	22	6	1	..
1889.....	1,069	802	53	15	6	1	877	..	4	4	9	46	54	35	27	12	1	..
1890.....	1,049	775	57	8	3	1	842	3	5	10	7	40	54	52	25	9	2	..
Total.....	11,137	8,652	579	116	30	18	9,395	32	24	47	108	406	447	355	216	91	15	1

TABLE VIII.
Mortality of Females caused by Syphilis in England.

YEAR.	All ages.	Under 1 year.	1 +.	2 +.	3 +.	4 +.	Total under 5.	5 +.	10 +.	15 +.	20 +.	25 +.	35 +.	45 +.	55 +.	65 +.	75 +.	85 +.
1881.....	998	695	65	7	2	2	771	1	3	3	21	76	56	30	29	7	1	..
1882.....	1,069	751	62	16	3	1	833	4	3	10	21	58	61	40	29	9	1	..
1883.....	1,133	831	81	13	5	2	932	2	5	8	19	62	54	35	11	4	..	1
1884.....	1,106	803	79	13	2	1	898	2	3	4	19	49	54	42	30	3	..	..
1885.....	1,035	748	64	6	7	2	827	2	1	9	20	60	53	30	19	12	2	..
1886.....	1,063	780	72	22	3	1	878	1	2	7	16	47	55	27	19	8	3	..
1887.....	969	723	51	6	4	2	786	7	5	3	15	50	45	31	19	8	..	..
1888.....	943	693	48	8	7	1	757	2	4	8	11	52	42	33	21	11	2	..
1889.....	984	698	59	11	7	1	776	1	5	3	12	69	46	41	16	11	4	..
1890.....	1,007	710	49	9	4	2	774	..	4	7	17	62	65	42	20	13	3	..
Total.....	10,307	7,432	630	111	44	15	8,232	22	35	62	171	585	531	351	213	86	18	1

that might eventually cause death would be anticipated by discharge from the service, while the general mortality that has been cited embraces all kinds and conditions of men, other data may be used to obtain the average annual infection caused by syphilis. It has been shown that the ratio which the mortality from that disease bore to the number of persons affected thereby was in the Marine-Hospital Service eighty-four hundredths of one per cent; this is higher mortality rate in comparison with the number of persons affected by syphilis than has been elsewhere recorded. Calculating with this, the 1,742 male deaths would imply 207,380 males affected by the disease, or 20,738 per annum in a population of some twenty-three million.

While recognizing the various sources of error that might make such an estimate more or less fallacious, it is based on as accurate evidence as it is possible to obtain, and it is believed that it is much nearer the truth than various extravagant estimates that have been published at various times.

If a similar calculation is made with the deaths of females over five years of age, the total estimate reaches 45,440 persons affected with syphilis annually, or about two in each thousand of population—certainly not a high figure.

TABLE IX.

Ratio of Mortality at Different Age Periods to Total Mortality.

AGE PERIOD.	Males.	Females.
Under 5.....	84.35	79.86
Over 5.....	0.28	0.21
10+.....	0.21	0.33
15+.....	0.42	0.60
20+.....	0.96	1.65
25+.....	3.65	5.67
35+.....	4.01	5.15
45+.....	3.18	3.40
55+.....	1.93	2.06
65+.....	0.81	0.83
75+.....	0.13	0.17
85+.....	....	....

The Socio-Economic Relations of Syphilis.—An important feature of the prevalence of syphilis is the influence that it exercises upon social economy, for the loss of time and of wages that it causes is not inconsiderable. In Table II it is shown that the average duration of treatment of such cases varies from 24.7 to 27.1 days. The Marine-Hospital Service averages the cost of treatment at one dollar a day; so the cost of treatment amounts in dollars and cents to the number of days the individual is treated. But in addition to this loss there is that of the wage-earning power for the same period, and as the treatment does not cost the sailor anything, and as his average wage in the American mercantile ma-

rine is something more than a dollar a day, the total economic loss is in dollars about double the number of days of complete disability.

In the army the average number of days a soldier was in the hospital on account of syphilis varied from 31·4 to 33·4 days (see Table III). As the pay of the American soldier is not as high as that of the sailor in the mercantile marine, the direct monetary loss is not so great; but here the loss of service is calculated on the basis of the number of men rendered ineffective in consequence of disability incident to disease, and from twenty-one to twenty-four men in a thousand were so rendered by this particular disease.

The records of the navy show (Table IV) that the average number of days' treatment in the hospital varies from 22·3 to 29·2 days. Here, also, the calculation is made of the number rendered ineffective by the disease, amounting to 46·3 men per thousand.

From these figures it is found that the hospital treatment of the sailor of the navy and of the mercantile marine averages respectively 25·8 and 25·9 days, while that of the soldier averages 32·4 days; or for the three services the average is twenty-eight days. As there is no evidence to show that this disease is more or less severe in these than in other vocations in general, it is believed that twenty-eight days is a fair general average of the loss of time incurred by each person infected with syphilis. This number of days further denotes that there is loss of wage-earning capacity that is proportional to the average of wages in the country for which the estimate is made, as well as a charge on the community or an expenditure of savings during the period of disability.

Influence of Syphilis upon Health and Longevity.—The influence exercised by syphilis upon health and longevity may be largely estimated by an examination of the mortality statistics. Referring to Table IX, it may be seen that there is a gradual rise in the percentage of deaths occurring at each quinquennial or decennial age period from five years to thirty-five years, when the maximum is reached in the decennalia, twenty-five to thirty-five for women, and thirty-five to forty-five for men; after these ages there is a decided decrease. As the major portion of the cases of acquired syphilis develop after the fifteenth year, these percentages show that the disease is either comparatively rapidly fatal or that it exercises but little influence on the expectation of life.

And yet the expectation of life apparently varies in different countries. In Table X there is a comparison of the percentages of deaths due to syphilis in London and in New York, in both sexes and in different age epochs.

There is a marked disparity in the evidence presented by the records of these metropoli of their respective countries; for the statistics of London conform in general to those of England (*vide* Table IX), while

those of New York show a much less mortality in consequence of congenital syphilis, an excess of female over male congenital syphilis, while in the age periods over twenty years male mortality is greater than female mortality. Unfortunately, there are no national or State statistics with which these figures may be compared; but they suggest that there are social conditions in existence in England that favor the increase of syphilis in women, as well as an increase in congenital syphilis.

TABLE X.
Comparing Deaths caused by Syphilis in London and New York.

AGE PERIOD.	LONDON.		NEW YORK.	
	Male.	Female.	Male.	Female.
Under 1 year.....	79·8	74·7	59·1	64·0
Under 5 years.....	85·5	82·2	63·5	69·3
5+.....	0·8	0·8	1·4	1·3
20+.....	0·8	1·6	1·6	3·5
25+.....	3·9	4·3	14·0	11·4
35+.....	4·0	4·1	7·5	6·8
45+.....	2·5	3·8	6·6	4·7
55+.....	1·5	1·4	2·8	1·6
65+.....	0·6	0·6	2·0	1·1

It has often been claimed that the fact that syphilis causes many chronic diseases, especially of the nervous system, and that deaths are recorded as caused by such diseases when primarily syphilis is the inciting cause, is a large element of error in making deductions from mortality statistics in general. There is good reason for agreeing with Gowers, who says (Lettsomian Lectures on Syphilis and the Nervous System, Philadelphia, 1892): "When there is a history of syphilis, the fact that we can not trace any other cause for an existing disease does not justify us in concluding that the disease in question is due to syphilis. To do so is to treat the unknown as nonexistent, and to base our induction not on knowledge but on ignorance."

Relations to Life Insurance.—One of the most important means of judging of the influence of syphilis upon health and longevity would be the experience of the many life-insurance companies of this country. Letters were addressed to the medical directors of all the principal life-insurance companies, asking:

1. Whether the company would accept as a risk a person that had syphilis some years before applying for insurance.
2. To what extent an acceptance would depend upon the subsequent history of the individual from the time of the initial lesion, particularly in regard to treatment.
3. Whether persons so affected would be classed as hazardous risks.
4. What was the number of deaths among those insured in the com-

pany that were directly due to syphilis; what proportion these deaths bore to the total mortality; and what was the proportion of deaths (due to cerebral, renal, or other lesion) indirectly due to early syphilitic lesions.

5. Whether applicants truthfully answered the question, usually printed in the medical examiner's report, regarding the existence of early syphilitic lesions.

Of the thirty-four companies to which these questions were addressed seventeen had the courtesy to give the information desired, for which I herewith express my obligation. In reply to the first question, thirteen answered that they accepted persons that had been so affected as risks; two, that they rarely accepted such risks; and two, that such risks were very rarely accepted.

The basis on which these risks were accepted is, in general, as stated by one of the medical directors, only when there is evidence of the very best health previous to the attack; of the attack being of a mild type, of a thorough and protracted course of treatment having been carried out, and of freedom from any suspicion of recurring symptoms for several years after the initial lesion. While this is in effect the principle adopted by all the companies taking these risks, several have special rules. For example, one company only accepts such cases seven years, another company three years, after the initial lesion; another makes the number of years' interval required dependent upon the general history of the individual; another makes no effort to hunt up the past syphilitic history of the applicant, judging of the influence of the disease by the results of the medical examination made at the time of application; two others require an interval of one year following primary syphilis, of five years following secondary syphilis, while tertiary syphilis entails absolute rejection.

In reply to the third question, fourteen companies stated that a risk was either good or bad, and applicants having a syphilitic history were received on ordinary terms. One company stated that such a risk was only accepted for a fifteen-year endowment policy; one, that such risks were not accepted at the rate of an ordinary life; and one, that they were charged for as extra-hazardous.

In reply to the question regarding the experience of the company with mortality from syphilis, only two companies could furnish any figures, though all said that it was extremely small. In one there had been five deaths caused by syphilis in a mortality experience of 22,484, something more than two hundredths of one per cent of the total mortality; while in the other three were seven deaths due to syphilis in 10,952 deaths from all causes, equal to six hundredths of one per cent. These percentages are very small, and not greater than might be due to syphilis that was acquired after the policies had been issued on a healthy life.

Regarding the reliance to be placed upon the truthfulness of the answer made by the applicant, while many of the companies state that they believe a truthful answer is made, one examiner says that his "company apparently has a very virtuous set of members who have been remarkably free from venereal lesions"; and another, that "very few answer 'Yes' as to having had syphilis—so few that, if we were to judge of the prevalence of this disease by the replies which are made, we should say that syphilis is exceedingly rare in the United States."

This analysis of the replies that were received shows that the larger portion of these companies agree with the position taken by European companies, and accept such persons as have had syphilis, have been properly treated, and have had neither secondary nor tertiary lesions, as risks. The question is one of great importance to these companies, because if they accept such risks they may be acting in a manner very prejudicial to their interests, while if the rule is to reject such applicants they may voluntarily deprive themselves of a large amount of business that involves no more risk than do other or ordinary lives.

Dr. H. Mireur, in an interesting paper on syphilis in relation to life insurance (*Marseilles Médicale*, 1881, vol. xviii, p. 328 *et seq.*), calls attention to the fact that syphilis is a constitutional disease, that effects a vitiation of the blood and produces accidents of very variable nature and gravity. Like all and much more than some diseases, this affection differs in intensity in extraordinary proportions. There is an infinity of different degrees from that benign form that only manifests itself by some slightly appreciable symptoms and that may be cured without leaving any trace, to that severe malady that fortunately occurs infrequently in our day and that constitutes one of the most hideous diseases of the human species. The causes of these diverse phenomena are precise; science has defined them long ago, and they are indicated both by the nature of the infecting virus and by the temperament of the individual infected. Add to this primordial etiology the influence of regular treatment, well considered and well followed, as well as that of severe regimen, and there is an explanation of the differences that may be observed every day in the intensity of the disease. In the presence of these facts, established by daily observation, there is no uniform line of procedure that can be established by the insurance companies; it is necessary for them to act according to the family and the personal history of the case, and the general condition of the applicant when examined. It is a rare exception that the pernicious influence of the disease is not exercised upon the infected individual at the time it was acquired, and the statistics that have been presented show the slight influence that it exercised upon mortality.

The existing evidence regarding this matter permits the formulation of the following propositions:

1. There is no evidence that shows that syphilis has, in the great majority of cases, any direct influence upon the mean duration of life, and consequently it should not be an obstacle to insurance.

2. In cases of secondary syphilis in which treatment has been long and regularly followed without further evidence of the disease being presented, the medical examiner may safely recommend the acceptance of the risk.

3. In cases in which there have been grave or tertiary symptoms the acceptance of the applicant should be the exception and his rejection should be the rule. Such persons should be examined by two or more examiners, and should be classed as extra-hazardous risks, and for ten or at most fifteen year policies.

Syphilis Incontium.—It is a very difficult matter to approximate an estimate of the proportion of syphilitic cases that are of extra-venereal origin. Interesting as collections of cases of syphilis incontium (the *syphilis imméritées* of the French writers) may be, they only indicate the various methods other than sexual by which syphilis may be acquired. Fournier, whose experience is probably as extensive as that of any specialist in venereal diseases, says (*Annal. de Derm et de Syph.*, 2 S., vol. viii, 1887, p. 757) that in a number of years he had treated in his office eight hundred and eighty-seven women for syphilis, forty-five of whom suffered from syphilis of nonvenereal origin. In these cases there were:

Hereditary syphilis.....	7
Syphilis contracted in infancy.....	4
“ acquired by nurses from sucklings.....	8
“ “ by midwives.....	5
“ “ from nurses, etc.....	12
Vaccinal syphilis.....	2
Syphilis from Eustachian catheterism.....	2
“ acquired by rape.....	1
“ of unknown but nonvenereal origin.....	4
Total.....	45

So 5·7 per cent of the total cases were of nonvenereal syphilis, and when the number of cases of hereditary syphilis is eliminated from consideration the proportion is reduced to 4·4 per cent. He further analyzed the character of the eight hundred and forty-two women, and he states that it affected—

Women living as prostitutes.....	366
Married women.....	220
Women of unknown social condition.....	256
Total.....	842

Of the married women, twenty acquired syphilis from lovers instead of from their husbands; in two, both husband and wife had syphilis, and

it was impossible to say which acquired it from the other; and in thirty-four instances he could not interrogate the husband, so that there were only one hundred and sixty-four indubitable cases of wives acquiring the disease from their husbands. Of these cases eighty-two were ante-nuptial syphilitics, thirty-nine were post-nuptial, and in forty-three instances the date of infection was unknown. In one hundred syphilitic women, eighty-one belonged to the category of prostitutes and nineteen to that of married women: so Fournier concludes, with sarcastic humor, that four fifths of the women acquire, if the expression is pardonable, syphilis honestly.

It is therefore apparent that this syphilographer, living in a metropolis where the opportunities for his investigations in this regard are unsurpassed, attaches but small importance to the influence that extra-sexual infection exercises upon the prevalence of the disease. And this experience is undoubtedly that of most physicians; Fournier's percentage of this form, if form it may be called, of syphilis being undoubtedly higher than the real percentage is because he is oftener consulted by persons so affected than is the general practitioner. Personally the writer would state that he has attached but little importance to the denials of hospital patients of the sexual origin of chancres that were of recent origin, notwithstanding their statement of some long-past date as the last time of their indulgence in sexual congress; and it is believed that evasion and prevarication in this matter is not a rare experience with most hospital physicians.

Relation of Syphilis to Marriage.—It has been considered that the greatest danger that syphilis possessed for others is the infection of the wife by the syphilitic husband. The problem of the duration of the syphilogenic capacity in relation to marriage is one of the most important questions that the syphilographer is called upon to decide.

The entire question rests upon the curability of syphilis, for if that disease may be cured, it is safe for the person that was infected to marry; and if it is an incurable disease, then risk is always run. Here, again, there is a wide diversity of opinion, for Gowers says (*Syphilis and the Nervous System*, 1892): "There is no real evidence that the disease ever is or ever has been cured, the word 'disease' being here used to designate that which causes the various manifestations of the malady. The short statement that 'syphilis is an incurable disease' is legitimate, if we recognize that 'incurable' means that there is no proof of cure. . . . No treatment, however thorough, will bring syphilis, as a disease, to an end, so that the patient does not suffer again from any of its direct effects." Most syphilologists agree with R. W. Taylor (article "Syphilis," *Hare's System of Therapeutics*, 1892), that "if an energetic and thorough treatment be followed for two years or two years and a half, the patient will

be cured, as shown by the enjoyment of good health, by freedom from all syphilitic manifestations, and by his or her ability to procreate healthy children." Though Fournier, in his classical *brochure* on Syphilis and Marriage, says, "Three or four years methodically devoted to an energetic medication—such, in my opinion, is the necessary *minimum*—I will not say to cure the disease, but to avert its dangerous manifestations both for the present and for the future," apparently agreeing with Gowers's position. Elsewhere in this volume this question of the curability of syphilis has been discussed *in extenso*, and it is not germane to the topic here under consideration; all authorities agreeing that after prolonged treatment, if there are latent foci of infection, they remain in abeyance, and *pro tanto* the patient is cured.

In the question of the relation of syphilis to marriage there is involved the danger of syphilis to the healthy wife or husband, and the danger to the children.

Fournier has emphasized the conditions that must be required in order to permit the marriage of a syphilitic subject. They are: First, the absence of existing specific accidents; second, the advanced age of the diathesis; third, a certain period of absolute immunity consecutive to the last specific manifestation; fourth, nonthreatening character of the disease; fifth, sufficient specific treatment. In view of the subject-matter of other sections of this work, it does not seem advisable or necessary to here present the reasons for the acceptance of these facts.

In considering the advisability of recommending, or rather sanctioning, the marriage of a person that has been infected, not only should the preceding facts be ascertained and carefully weighed, but it would be well to review the theses formulated by Morrow (*Journal of Cutaneous and Genito-urinary Diseases*, 1887, vol. v, p. 126):

"1. The facts of every-day observation show that there is nothing constant in contagion, nothing certain in heredity. Men marry with syphilis in full activity of secondary manifestation, and never infect their wives or transmit the disease to their offspring. These negative observations are, however, entirely valueless as a basis for estimating positive results.

"2. The modern division of syphilis into secondary and tertiary periods, based upon anatomical forms and processes, does not furnish a safe criterion for determining the contagious or noncontagious character of the lesions.

"3. The chronological completion of the secondary stage does not always mark the definite disappearance of the virulent principle; clinical experience shows that late lesions are exceptionally, but none the less certainly, the source of contagion.

"4. While in the immense majority of cases the contagious activity of

syphilis and its susceptibility of hereditary transmission cease after the third or fourth year, yet well-authenticated observations prove in the most positive manner that these qualities sometimes continue in force much longer, and may be manifest in the fifth or sixth year of the disease, or even later.

“5. The aptitude of syphilitic parents to procreate diseased children may persist after the cessation of all specific manifestations; the contagious stage of syphilis is not, therefore, the exact measure of the duration of hereditary influence.

“6. The precise date in the evolution of the diathesis, when the syphilitic organism undergoes that radical transformation which marks the limit of its contagious or transmissive power, does not admit of mathematical expression.

“7. It is probable that this limit varies in different cases, and that many circumstances contribute to advance or defer it.

“8. The type of syphilis, the constitutional peculiarities of the patient, the character of the treatment, the presence or absence of certain conditions which are recognized as factors of gravity in syphilis, all exert a modifying influence.

“9. All these elements should be taken into consideration in deciding upon the admissibility of a syphilitic man to marry; each case should be studied upon its individual merits.

“10. The direct paternal transmission of syphilis without preliminary infection of the mother may be classed among the most conclusively established facts of medical science.

“11. It is, therefore, a dangerous doctrine to teach, that the sole risks a syphilitic man introduces into marriage consist in the contagious accidents he may bear upon his person.

“12. The arbitrary designation of a limit of three or at most four years, as perfectly safe for a syphilitic man to marry, with or without treatment and irrespective of the actual existence of specific lesions, is unwarranted by science or the teachings of experience.”

Demographic Relations of Syphilis.—In the United States the question of the relation of syphilis to race should be studied in regard to its prevalence among the Indians and the negroes.

There are many vague references to the decimation of the Indian tribes in the past and present centuries by the ravages of syphilis. Dr. Lake, in a paper on this subject in the Philadelphia Medical Register, says that syphilis is rare in certain tribes, as the Indians are syphilized; but there is a large field for investigation in this particular.

In a study of the comparative frequency of disease in the white and colored races, published in the Annual Report of the United States Marine Hospital Service for 1886, the writer found that in a series of hos-

pital patients there were 403 whites and 525 negroes; in this number there were suffering from

Syphilis, secondary.....	17 whites,	20 negroes.
" tertiary.....	2 "	3 "
Total.....	19 (4·7%),	23 (4·3%).

There were treated in the dispensary, in the same period, 1,598 white and 1,311 negro patients; among these were

Syphilis, primary.....	9 whites,	18 negroes.
" secondary.....	85 "	77 "
Total.....	94 (5·9%),	95 (7·2%).

In the army, in the decade 1880 to 1889, the admissions to the hospital on account of syphilis were, among the white troops, 34·87 per thousand of mean strength, and the discharges from the service were 3·47 per thousand; among the colored troops the admissions were 51·98, and the discharges from the service 4·58 per thousand of mean strength.

Dr. H. R. Carter, in a careful study of the manifestations of syphilis among negroes (Annual Report of the Marine Hospital Service, 1883), concludes that it pursues a milder course in that race than in the white. It is marked by but few cutaneous lesions, and these mainly pustular; the mucous membrane is very rarely and then but slightly affected; nodes and periostitis are rare; caries and deep ulceration are rare in early syphilis, although the synovial membranes are much more vulnerable.

Dr. I. E. Atkinson (Maryland Medical Journal, 1877, vol. i, p. 135) considers that there is a marked predisposition toward the return of symptoms, and constant vigilance in meeting them must be exercised.

Personally my experience coincides with Carter's, that the prognosis of syphilis in the negro is even better than in the white, and that a residuum of immunity to the severer lesions of this disease must be ascribed to racial peculiarities. This conclusion is in part borne out by the opinion of Chassaniol regarding the negro in Africa. He says (Archives de Méd. Navale, 1865, tome iii, p. 505), tertiary lesions are much less frequently observed among the negroes of Senegal than among Europeans.

Syphilis has been introduced into all the countries of the world, but its propagation depends largely upon the characteristics of the population. Certain countries seem to be remarkably exempt. Jacolet (Thèse de Paris, 1861) states that syphilis is quite rare in Iceland, even in Reikiavik, where there is a mixed population and where exotic cases have been observed; Lesser (Archiv f. Dermatologie u. Syphilis, 1891, No. 1, p. 37) states that Dr. Schierbeck, of Reikiavik, informed him that this immunity of the Icelanders was due to the scattered character of the popula-

tion, the absence of prostitutes or houses of prostitution, and the virtuous character of the inhabitants.

Gras states (*Thèse de Montpellier*, 1867) that in Miquelon, while syphilis had been introduced by the first inhabitants, it had never secured a foothold, and in an entire generation he had never seen a case.

H. Rey states (*Annales de Dermatologie et de Syphiligraphie*, second series, vol. i, 1880) that in Spain, in consequence of the lack of hygienic measures, syphilis had many victims, especially in the meridional regions. At Malaga there were 182 cases of syphilis treated in the hospitals per thousand patients suffering from all diseases; while in the English garrison at Gibraltar there were only 84 cases of syphilis in each thousand patients. In Portugal there were 135 cases of syphilis to each thousand of general diseases in the army. Yet the sanitary statistics of Barcelona for 1888 show that the mortality caused by syphilis is but 18 per thousand of population.

According to Dr. Schneppe (*Du Climat de l'Egypte*, 1862) there were in the European hospital at Alexandria, from 1844 to 1861, 71 syphilitic patients in each thousand with all diseases. In the Somerset Hospital, Cape Town, from 1871 to 1874, there were 100 syphilitic patients in each thousand with all diseases.

While in China Dr. Galle states (*Thèse de Paris*, 1875) that there were in the general hospital at Shanghai 191 cases of syphilis in each thousand cases treated, he also says that syphilis presents a malignancy there that is not without danger, in view of the debilitating influence of the climate.

In general, it may be said that tropical syphilis is more dangerous to the European on account of the anæmia to which his residence in hot climates subjects him. In such climates the evolution of the disease is more rapid, the secondary eruption often appearing in half the period, after the initial sore, that it occurs in temperate zones.

The ravages that syphilis has caused among primitive people, such as the natives of the South Sea islands, is not to be attributed to any predisposition on their part, but to the same causes that made syphilis such a devastating plague in the sixteenth and seventeenth centuries. As Henry Lee has said (*Transactions of the International Medical Congress*, London, 1881), when any contagious disease affects a population for the first time it is generally more severe than at any subsequent period, and it is often more virulent in a place where it is not bred than in a place where the people have almost trained themselves to an immunity from it. After a time, which may be longer or shorter, the disease diminishes in intensity and becomes of a milder character, and in some instances dies out.

If there is any immunity enjoyed by any race, it is due to the fact

that that race is not brought into contact with those that are infected, or that there is not that debility of the system caused by alcoholic or venereal excess, or that there is the influence transmitted by the syphilization of ancestors.

Occasionally what seems to be an extravagant statement is made regarding a country. Thus Blane says (Transactions of the Medical and Physiological Society, Bombay, 1870) that in Abyssinia syphilis is so prevalent that nine tenths of the inhabitants are more or less affected with the disease; every individual, male or female, has had, has, or will have syphilis! Obviously such a statement must be regarded with great caution, being based upon no definite record of a number of examinations of supposedly healthy persons.

So, also, must caution be shown in accepting the statements of travelers that are not medical men. Palgrave, for instance, has been accepted as the authority for the statement that syphilis is frightfully common in Arabia—a statement that is unsupported by any evidence that enables the reader to judge of the frequency with which it occurs or the severity of its manifestations.

Occasionally local epidemics of syphilis have occurred similar to that in Fiume, and that was referred to as the *mal de Fiume*, or *Scherlievo*, from the name of the village in which it first appeared. In that instance a contagious disease appeared in 1800, and lingered throughout Istria and Dalmatia until 1855; it presented many of the symptoms of syphilis, and has been thought to be that disease propagated by ordinary social intercourse. In 1867, in Capistrello in Abruzzo, there was an endemo-epidemic of syphilis that lasted eight years. In a report upon it (*Annales de Dermatologie et de Syphiligraphie*, 1869, vol. i) the statement is made that it was started by a woman of that locality who had nursed a strange syphilitic infant, and in a population of three thousand more than three hundred became syphilitic. It is also said that at Colihiera, in the province of Bellene, fifty persons were affected by syphilis from a similar source.

Podolinsky (*Compt. rend. du Congrès Médicale de Montpellier*, 1869) stated that syphilis is particularly grave in the neighborhood of the Baltic, in Podolia in Kazan, in Siberia, and in Kamchatka. He states that in the interior of Russia the governments of Kief, Pultava, and Ternigon suffer most. In the former the author knows villages in which all classes of the population are infected; and he instances the village of Jeroslawka, in which there were one hundred and twenty families, thirty of which were known to be syphilitic, while only sixty-four could be affirmed to be exempt.

Prostitution and Syphilis.—With our knowledge of the means by which this disease is transmitted, as well as of its independence

of climate, soil, water, or food—the factors that are potent in disseminating other infectious diseases—the study of the geographical distribution of syphilis becomes more a matter of interest than a source that permits deductions regarding the means that are necessary to secure the control of or to eradicate the disease. Almost all propositions for the restriction of syphilis are based upon the supervision of the most usual method of its dissemination—prostitution. Reference has been made to the belief, prevalent in many countries, that the disease is propagated by ordinary social intercourse; but such a theory would not gain wide credence among scientific men to-day, because it is not our experience that syphilis is otherwise than rarely spread by mediate contagion; and if prostitution did not exist in those localities that suffered from endemo-epidemics of syphiliform disease, it is quite probable that clandestine sexual intercourse served as a disseminating medium for syphilis.

Repressive Measures.—Occasionally a severely radical measure has been proposed, as by Dr. G. F. French (Transac. Maine Medical Society, 1878), who would stamp out syphilis by extirpating, in those affected, the sexual organs. Argument as to the futility of such a proposal is needless.

The American Public Health Association appointed a committee to consider the subject, and it was proposed that a law should be enacted that would make it a criminal offense to knowingly communicate, directly or indirectly, or to be instrumental in communicating, a contagious disease, such as smallpox, scarlatina, or venereal diseases; and giving to boards of health, and to State and municipal health officials under their control, the same power of preventing, detecting, suppressing, and gratuitously treating venereal diseases that they now possess in the case of smallpox or other contagious diseases.

An idea of the comprehensive measures that have been suggested may be obtained from Dr. M. E. da Cunha Bellem (Trans. Int. Med. Cong., London, vol. iv, p. 454), in which he alludes to syphilis as the greatest evil that afflicts humanity, and urges that all measures should be employed to exterminate that evil, advising an international convention for the purpose of devising the means for generally and efficaciously combating it. As coitus is not the only means of acquiring syphilis, inquiry and inspection of those that are suspected of being syphilitic do not imply dishonor, humiliation, or blame. Inspection, examination, and enforced hospitalization are the only means of preventing the propagation of syphilis. Inspection should be made of all prostitutes, of soldiers, of sailors, of police, of workmen in fabrics, of the entire *personnel* of a regiment when it arrives in a town, as well as that of a vessel when it arrives at a port. No patient may leave a hospital until cured of syphilis. Physicians will denounce to the police those whose visages indicate

syphilitic taint, and such persons shall be immediately inspected. Pharmacists shall denounce those who apply for specific medicines. Midwives shall call in physicians when they suspect an infant of being syphilitic. Men and women shall denounce those that gave them syphilis; if the woman has a good reputation, the authorities should proceed with the greatest care, and severely punish any false allegation. All pederasts must be kept under police observations. No person shall marry without presenting a certificate that they are free from syphilis, well-connected persons rendering an enormous service to humanity by facilitating these examinations. To have syphilis is a misfortune, not a crime; to knowingly transmit it is a criminal act against humanity.

The Regulation of Prostitution.—At a meeting of the Royal Academy of Belgium, on October 29, 1887, these resolutions were adopted :

1. The Belgian Royal Academy considers that the regulation of prostitution is necessary to restrain the development of venereal diseases and of syphilis.

2. Prostitution that advertises itself in the streets and public places, being the most potent cause in the propagation of venereal diseases and syphilis, should be interdicted.

3. Persons convicted of living by habitual prostitution should be inscribed and subjected to sanitary visits.

4. Registration and medical visits should only be authorized under safeguards that would, under each and every circumstance, protect the honor and dignity of the person.

5. From the exclusive standpoint of public health the Academy declares that frequent and conveniently administered sanitary visits constitute the most efficacious means of arresting the propagation of venereal diseases and syphilis.

Registration in France.—France has been regarded by many that have paid attention to the subject of the regulation of prostitution by the State as the country that had laws calculated to limit venereal disease. But Barthélemy states, in a paper on the public prophylaxis of syphilis (*Annales de Dermat. et de Syphilig.*, 2 S., vol. ix, p. 721), that it is generally known that the sanitary service of Paris is in a most deplorable condition, being conducted without vigor or regularity, and that it should be completely reorganized. That there was a general recognition of this fact was evidenced in the discussion at the Paris Academy of Medicine (*Bulletin Acad. de Méd.*, 1888, vol. xix, pp. 155, 248, 291, 354, 410, 424, 464), and the adoption in April, 1888, of conclusions calling the attention of the public authorities to the increase in solicitation in public places in recent years—this solicitation not being confined to the streets, but occurring in shops, especially those in which wine and beer are sold, and also ex-

tending to lyceums and colleges, thus exciting minors to debauchery. The consequence of these various modes of solicitation is the dissemination of syphilis, and public health demands the registration and weekly inquisitorial visitation of all women that live by prostitution. If a woman will not consent to registration, it should be imposed by judicial authority, and any woman found diseased should be confined in a special hospital. Hospital facilities for treating venereal diseases should be increased by special wards; the medicines necessary for treating such diseases should be furnished gratuitously in all hospitals.

Further efforts should be made to reach those affected by gratuitous consultations in dispensaries attached to all hospitals. In all provincial towns there should be special services for the treatment of venereal diseases. The venereal services at all hospitals should be freely opened to medical students, and no student should be permitted to graduate that has not a certificate of service in a venereal clinic.

Barthélemy argues that no one is under any legal obligation to be a prostitute; but if any one has the right of disposing as she pleases of her body, it is necessary that this merchandise, like all other, should not damage the consumer nor constitute for him a cheat or a peril. With this, as with other things, it is too late to act when the evil is done; it is therefore necessary to prevent it in the beginning. He would say, *en passant*, that it is infamous and shocking to qualify these vendors as vendors of love, as do certain euphemistical writers; they are rather vendors of pleasure, or, better, of enjoyment. Society is under the necessity of exacting the healthiness of these vendors. He considers that freedom of prostitution encourages debauchery, and that it is at the same time a grave public danger.

That the law regulating prostitution has utterly failed in accomplishing in France the ends that were intended, is shown by Barthélemy in his work on Syphilis and Public Health, in which he says that one hundred thousand women live by prostitution in Paris, while but four thousand are registered. He states that of 1,932 unregistered women arrested in 1888, 680 had venereal diseases, and 262 of these were syphilitic maladies. In 47,371 visits paid during the year to the dispensary by registered prostitutes, 143 cases of venereal disease were found, 56 of which were syphilitic; while to registered women, arrested in public places, 14,574 visits were made, and 195 cases of syphilis found in 314 cases of venereal disease. There were 42,795 visits made to brothels, and in 100 cases of venereal disease 54 were syphilitic.

In the Transactions of the International Congress of Dermatology and Syphilography, held in Paris in 1889, Dr. Butte publishes a careful study of the statistics of the results of the inspection of prostitutes in Paris during the thirty years 1859 to 1888. He has tabulated the number of

each of the three classes of prostitutes that were seen during the year, giving also the number in each class that were found syphilitic. These results he has finally arranged in a diagram that is reproduced in Fig. 1. During 1870 and 1871 the inspection service was apparently in abeyance, presumably on account of the Franco-Prussian War. The author considers that only approximate results are shown, because the unregistered women are seen but once, while the prostitute in a brothel is seen fifty-two times a year; as either can only, as a rule, have syphilis once, this argument falls to the ground.

Apparently there has been since 1873 a constant diminution in the proportion of syphilitics among prostitutes in brothels, though the sanitary inspection service has not eliminated it, and in the nature of existing conditions can not do this. There has been an irregular but none the less evident decrease in the number of syphilitics in the other two classes of prostitutes; though Butte thinks that this is fallacious, and that the number should be increased, frankly acknowledging, as did Barthélemy, that sanitary inspection did little in reducing the number of syphilitics among these classes. If the latter statement is so, then there must be many syphilitic women that are not reached by the regulations now existing in Paris.

The statistics are further verified by Dr. O. Commenge (*Recherches sur les Maladies vénériennes à Paris, dans leur Rapports avec la Prostitution clandestine et la Prostitution réglementaire de 1878 à 1887*), who, in an experience of ten years, found that of

Prostitutes registered by cards.....	7.3 per cent
“ in houses.....	12.0 “
Clandestine prostitutes.....	16.69 “

were suffering from syphilis.

Registration in Russia.—It can scarcely be said that the provisions of the law have been sufficient to reach the classes that are most dangerous to society in spreading syphilis. But that France is not singular in this respect may be learned from the elaborate study by Dr. E. Schperk (*Annales d'Hygiène publique*, 1875, vol. xlv, pp. 42 and 292) on the prevalence of syphilis in the feminine population of St. Petersburg. In that city, as in Paris, the law regulating prostitution seems to have failed in accomplishing its purpose, and Schperk considers the statistics of prostitutes registered in houses, of prostitutes registered by cards, and of clandestine prostitutes. He found that 34.2 per cent of those in houses, 40.1 per cent of those registered by cards, and 42.4 per cent of clandestine prostitutes were syphilitic. His statistics show that a prostitute may remain free from syphilis for a brief period, but, unfortunately for her and for society, it is very brief; she is early infected, and then becomes during a year and a half to three years, according to the

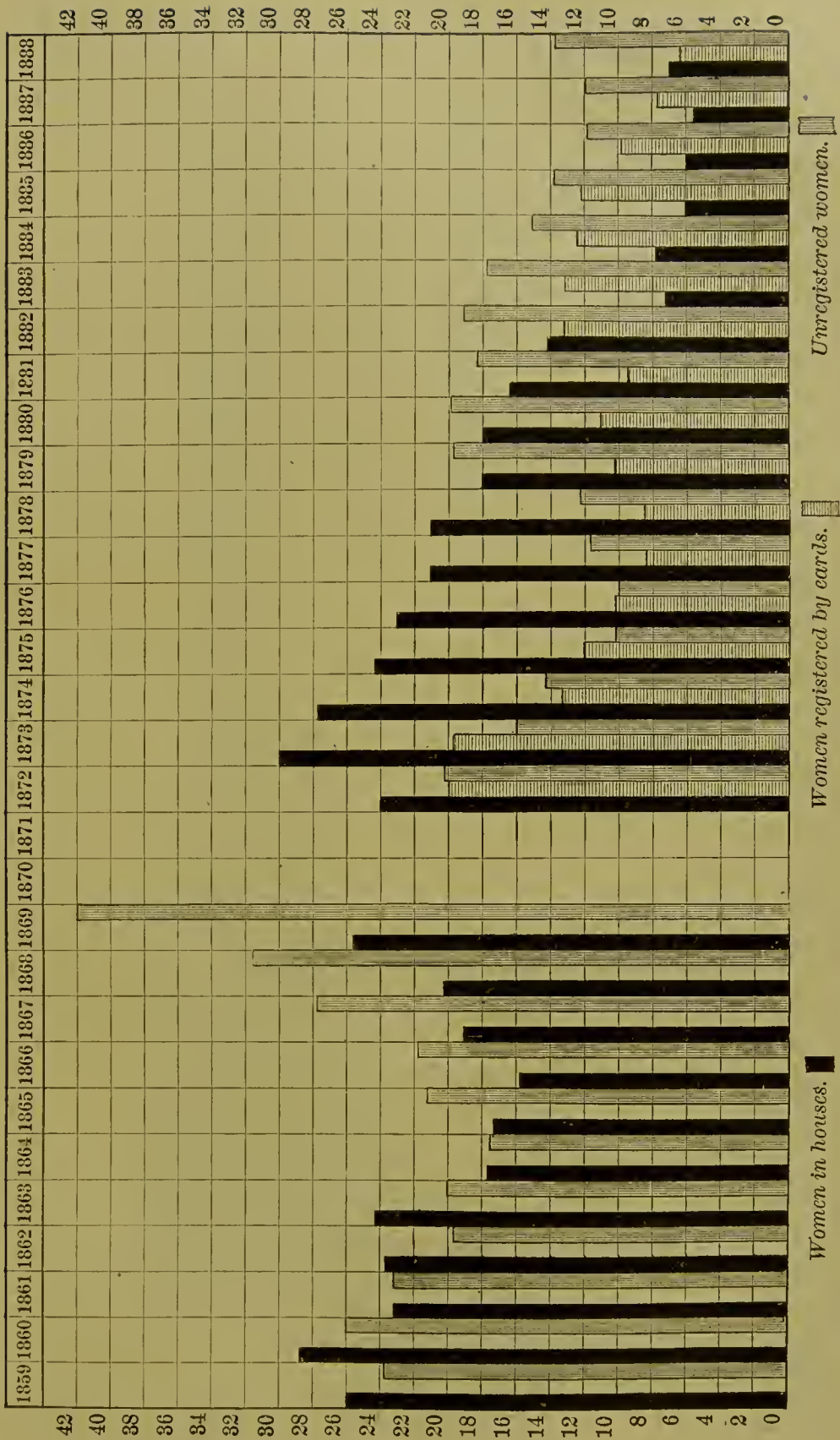


Fig. 1.—Diagram showing the annual percentage of syphilis in the three categories of Parisian prostitutes.

character of her constitution and its infection, one of the most dangerous members of her class. Notwithstanding the most careful surveillance of the sanitary police, notwithstanding all the conscience that the woman may have (supposing that she has any), she will inevitably communicate syphilis during the first days that follow the appearance of the primitive lesion and during the first days that succeed each recurrence.

Dr. Schperk presents a graphic chart (Fig. 2) in which the number of prostitutes in each quinquennial age period from fifteen to forty-five is represented by columns; these latter are shaded, so as to represent the number of prostitutes free from syphilis, the number having initial, secondary, and tertiary lesions, and the number that have had syphilis but that present no manifestations thereof. This shows that, with a few exceptions, after the age of twenty-five years all prostitutes are syphilized.

This deduction of Dr. Schperk is based upon a careful study of the material under his observation; and while it is true that the prostitute acquires syphilis in spite of rather than on account of these laws, it seems that these latter have signally failed to accomplish the purpose for which they were enacted.

The Contagious Diseases Acts.—Before leaving this phase of the question of the limitation of syphilis by statutory provision for the inspection and isolation of infected prostitutes, it will be well to survey the experience of England in this matter. In 1864, 1866, and 1869 certain contagious diseases acts were passed by Parliament for the purpose of lessening venereal disease in the army and navy, the essential principles of these acts being a combination of hygienic surveillance of prostitutes and hospital provision for their treatment. At the International Medical Congress of 1881, Clifford Allbutt said that these acts became the law under the idea that syphilis would be checked in its progress and reduced to manageable proportions. But this hope had not been fulfilled, because true syphilis appeared, according to statistics, to have actually increased, and it had certainly increased in the British army and navy. Allbutt considered the acts mischievous, useless, and thoroughly one-sided and degrading.

Henry Lee said of such legislation (Trans. Int. Med. Cong., 1881, vol. iv, p. 470) that if sufficient hospital accommodation were afforded the voluntary system would, on the whole, work better than that which obtained under the surveillance of the police. He thought that, whatever advantages may be claimed in favor of the operation of the contagious diseases acts in making a protected district apparently orderly and in preventing annoyance to the public, they have not hitherto been the means of diminishing syphilis.

Corroborating this is the evidence of the Sanitary Commissioner with the Government of India (Report of 1881), who said that for a number of

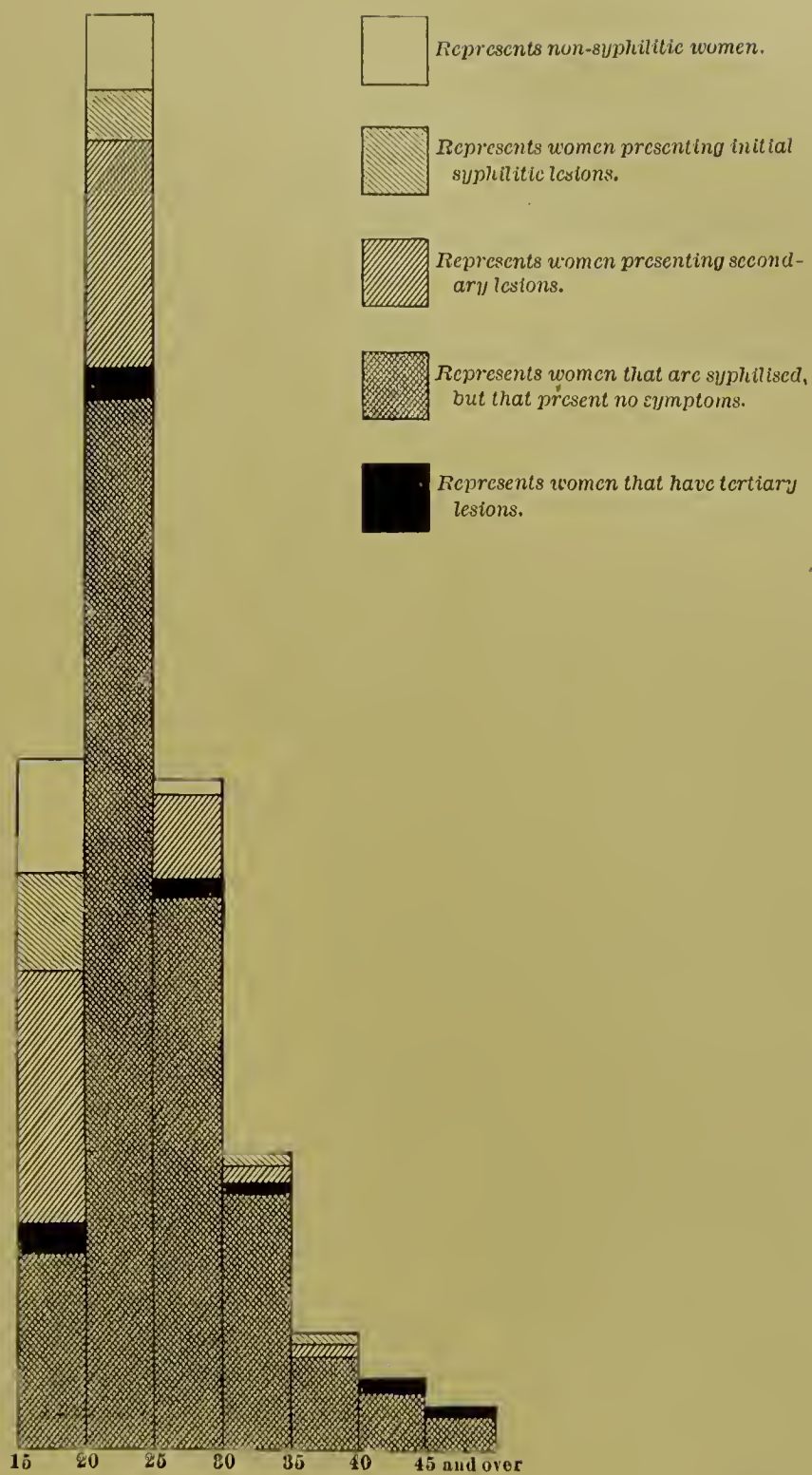


FIG. 2.—Proportion of syphilitic women in St. Petersburg prostitutes, arranged according to quinquennial age periods. The heights of the columns indicate the number of prostitutes in each quinquennium.

years the lock-hospital system had been very generally enforced in the cantonments of the three presidencies, but that year by year it became more and more evident that, however successful such a system promised to be when it was originally adopted, its practical working in India had proved a complete failure, because during the twelve years that the contagious diseases acts were in force in that country hospital relief for venereal diseases had been as great as ever.

Dr. J. Birkbeck Nevins read a paper before the Seventh International Congress of Hygiene, in which he presented the statistics of the fourteen stations that had been put under the provisions of the contagious diseases acts for six years before the acts were passed, for the sixteen years (1866 to 1882) of their operation, for three years during which the acts were suspended, and for the four years following their repeal. These show that there was an annual fall of 6·7 per cent from 146 to 87 per thousand strength, in the number of cases of primary venereal sore from 1860 to 1866; this reduction continued from the passage of the acts until 1875, when the low ratio of 33 per thousand was reached. But from 1875 until 1883 there was a steady rise, until there were 138 cases per thousand of strength during the last seven years of the acts, the rise being 27·7 per cent annually. Following the suspension of the acts, or in 1884, the ratio commenced to fall, and has continued to do so at the rate of 7·8 per cent annually until 1889, the last year recorded.

Dr. Nevins, however, failed to state whether similar curves existed in the records of secondary syphilis. The *Lancet* stated editorially (July 20, 1889) that at the fourteen stations at which the acts were in force the ratio of syphilis per thousand of strength was, in 1881, 27; in 1888 it had increased to 42, the acts being suspended about May, 1885. From 1881 to 1884 the numbers fluctuated, being respectively 27, 22, 25, 25. In 1885 the ratio was 26, while the numbers for 1886, 1887, and 1888 were 32, 45, and 42 respectively. In the several districts the increase seems to be even more marked. The ratio rose in Devonport and Plymouth from 21 in 1884 to 39 in 1885, 51 in 1886, while in the years 1887 and 1888 it was 49 and 41. At Portsmouth the ratio was 20 in 1884, and in 1885 it was 15. In 1886 it had risen to 42, while in 1887 it was 72; in 1888 it was 59. In the Chatham, Sheerness, and Gravesend combined district it rose from 22 in 1884 to 41 in 1888. At Woolwich the ratio was also 22 in 1884, but it rose in the following years to 28, 39, and 49, and in 1888 was 31. At Aldershot it fluctuated, the respective ratios from 1884 to 1888 inclusive being 34, 23, 30, 47, and 52. At Windsor it increased progressively from 28 in 1884 to 61 in 1888. At Shorncliffe the ratio rose from 18 in 1884 to 70 in 1885, since which it had been 38, 37, and 30. At Colechester it fluctuated from 29 in 1884 to 48 in 1888. At Canterbury the fluctuations were from 20 in 1884

to 68 in 1887, and 66 in 1888. At Maidstone the ratio was 39 in 1884; in 1887 it had risen to 69.

Other Measures to limit the Spread of Syphilis.—It must be conceded by all that those that have opposed the enactment of legislation directed to the sanitary surveillance of prostitutes have been prompted by honest motives, having no intention of belittling the importance of syphilis. But it has been considered that an analogous argument to that used in favoring such legislation would be to urge that all children's nurses should be licensed and subjected to examination at fixed periods, because they might be the source of tuberculous infection—a plan that would be inapplicable as well as ineffective.

At first thought the measures that should be adopted to control and eradicate syphilis seem very easy of application. Being a disease that is almost always transmitted by immediate contagion, the segregation and treatment of infected individuals would solve the problem. If it were possible to secure the isolation and detention of all infected persons from the time of and for at least three years following the appearance of the initial lesions, it might be possible to limit the spread of syphilis. But the experience of France, Russia, and England has shown that it is impossible, with any repressive regulations that have been adopted, to materially diminish the ratio of syphilitics among prostitutes. And when the impracticability of isolating and supervising other contagious diseases is considered, it may be appreciated that, however possible it might be by confining all persons affected with syphilis in an infective stage to almost if not completely exterminate that disease, the method is not feasible, particularly in a country where the assumed rights of the individual are as jealously guarded as they are in the United States.

Caveat emptor is the maxim of the market place; and if the conditions of society are such that the struggle for existence obliges many women to dispose of the use of their bodies to any purchaser, then let the buyer beware. There is no obligation that society should protect him, and there is no evidence that the injury he does or may do to innocent persons should demand legislative action looking toward securing such protection. The evidence that at least four fifths of the women that acquire syphilis do so as a consequence of their own viciousness or folly, as Fournier's heretofore quoted statistics show, disposes of the necessity for the exhibition of much sentimentality in their behalf. In matters of this sort it is necessary to proceed on a basis of fact and not of impression on the evidence that is afforded by collated experience rather than the sad details of a few cases of syphilis insontium that may come within the ken of some physician.

The sale of alcoholic beverages is licensed, but despite that fact and the existence of laws regulating disorderly conduct, the purchaser and user of

these commodities is more likely to injure the innocent than is the acquirer of syphilis. Which of our cities guarantees the purity of its water supply, or even adopts the measures that are necessary to prevent its contamination by sewage discharge or seepage?—and yet typhoid fever is more prevalent than syphilis. Which of our States guarantees the purity of the animal foodstuffs that are sold, or even efficiently supervises the sanitary character of these products?—and yet tuberculosis is a hundred times more dangerous than is syphilis.

Barthélemy has acknowledged that the most comprehensive regulation of prostitution will not suppress all syphilis, and makes the analogy that the laws against theft fail to stop thieving, though crime of that character is undoubtedly diminished in consequence of the existence of such laws. But the disparity in the character of the two kinds of specified legislation is evident when we consider that the laws against theft apply to the sole individual guilty—the thief; while the laws regulating prostitution apply to but one of the parties guilty of disseminating syphilis. That Barthélemy recognizes this fact is shown (*Comptes Rendus de la Congrès Internat. de Dermat. et de Syphilog.*, 1889, p. 787) by his statement that prostitutes, in all good faith, do not always recognize the gravity of syphilis. They see the facility with which this disease is acquired by themselves; in their eyes the impunity of the man that is so affected is too evident: so why should they imagine that they commit a fault when they in their turn transmit it? He acknowledges that clandestine prostitution makes incessant progress, though this increase he attributes to official negligence. Yet public brothels offered no more security than chance or clandestine prostitutes; and, in consequence, a new vice had arisen—prostitutes acknowledging that but a small proportion of men purchasing their favor proceeded by natural passages. This viciousness has extended from France to the United States, and the information that one acquires regarding both the women and men of this stamp indicates the existence of depravity that would make it desirable for syphilis to be a rapidly fatal disease that would wipe these sexual perverts out of existence.

Barthélemy would have all syphilitic women immured in a convalescent establishment outside of the city while the contagious period of the disease existed; while there they could pass the time in receiving professional instruction that would fit them to follow some trade when they were discharged from treatment. Prostitutes that had had syphilis at least five years, and that had been properly treated, might be exempted from the biweekly visits. This proposition ignores the fact that, notwithstanding the possibility of secondary syphilitic infection, there is the further possibility that such syphilized women might be the medium for transmitting the disease without being infected themselves. He also sug-

gests that premiums should be accorded to all the women that had been, during the year, punctual in making their visits to the sanitary inspector; and it would also be well to give premiums to women that, finding themselves diseased, reported without delay to the inspector.

Barthélemy recognizes the one-sided feature of dealing with the women alone, and suggests that men entering a house of prostitution should be examined by the matron, so that all that are diseased can be eliminated. He might go further, and demand that all patrons of these institutions should be supplied with cards certifying to their sanitary condition that they should present to the woman when they examine the last inspection date on her card. He realizes the lack of scruple that most of these men have in visiting women while suffering from some form of venereal disease, one expressing the sentiments of many when remonstrated with for such action. "I will pay them back," he said; "it is their business to chance and risk pox, as it is the soldier's to risk bullets." Most American physicians that have had any venereal practice will recognize that the type is not singular to France or to Europe.

In consideration of the history of the contagious and infectious diseases both in Europe and America, the statement may be ventured, without fear of contradiction, that typhoid fever or tuberculosis may be more easily prevented than syphilis, dependent as the latter is upon so many as well as such uncontrollable factors, some of which include the human characteristics of the want or frailty of the woman, the viciousness of the man.

One of the first and the most important means that should be adopted to decrease syphilis is a general regulation by all hospitals permitting the free admission of all syphilitics that apply for treatment, and particularly of those infected with the primary sore. It would be impossible to estimate how much these institutions have done in the past to increase the prevalence of the disease in question by refusing admission to such patients. In States and municipalities where there is an allotment of public funds for the support of hospitals, such an allotment should be refused any institution that discriminates against syphilitic patients.

It should be the rule in all hospitals to admit and discharge syphilitic patients at their own request, subjecting them only to the general disciplinary regulations of the institution. In some European hospitals, where the custom prevailed of requiring that a patient so affected should sign a voluntary undertaking not to leave the hospital without the consent of the medical superintendent, the abrogation of even this regulation has served to increase the number of syphilitics that apply for treatment.

As germane to this latter self-evident proposition is the desirability of the establishment in all large cities of special hospitals for cutaneous and venereal diseases, or the assignment in general hospitals of special wards

for the reception of such patients. Necessarily, such wards should be under the care of one well versed in these diseases. All dispensaries should include special services for cutaneous and venereal diseases.

It is generally credited that St. Augustine said that if prostitutes were suppressed, society would be inflicted by libertinism. It is this principle that has been responsible for inattention to the most potent means for restricting syphilis.

Osler says (Practice of Medicine, article Syphilis): "Personal purity is the prophylaxis which we, as physicians, are especially bound to advocate. Continence may be a hard condition (to some harder than to others), but it can be borne, and it is our duty to urge this lesson upon young and old who seek our advice in matters sexual. Certainly it is better, as St. Paul says, to marry than to burn; but if the former is not feasible, there are other altars than those of Venus upon which a young man may light fires. He may practice at least two of the five means by which, as the physician Rondibilis counseled Panurge, carnal concupiscence may be cooled and quelled—hard work of body or hard work of mind. Idleness is the mother of lechery; and a young man will find that absorption in any pursuit will do much to cool passions that, though natural and proper, can not in the exigencies of our civilization always obtain natural and proper gratification."

And Gowers says (Lectures on Syphilis and the Nervous System) regarding the prevention of syphilis: "One means alone remains, old as the malady itself, by which it can be prevented. One method, and one alone, is possible, is sure, and that one is open to all. It is the certain prevention secured by unbroken chastity. . . . The opinions that, on pseudo-psychological grounds, suggest or permit unchastity are absolutely false. Trace them to their ultimate basis, and they are groundless. They rest only on sensory illusions, one of the many illustrations of a maxim I have often to impress on various sufferers, 'There are no liars like our own sensations.' Rather, I should say, they rest on misinterpretations of these, always biased and often deliberate. With all the force that any knowledge I possess, and any authority I have, can give, I assert that no man ever yet was in the slightest degree or way the worse for continence or better for incontinence. From the latter all are worse morally; a clear majority are worse physically; and in no small number the result is, and ever will be, utter physical shipwreck on one of the many rocks, sharp, jagged-edged, which beset the way, or on one of the many banks of festering slime which no care can possibly avoid."

It has been thought that these quotations from two recognized authorities in medicine might do more to stimulate thought on this feature of the question than any personal remarks that might be regarded, as an easy means of dismissing the subject, or as *doctrinaire*.

The statistics that have been presented herewith do not show that syphilis is increasing, nor do they demonstrate that it is alarmingly prevalent or that it is very fatal. Regarding the latter point, it may be said that while the physician knows where syphilis begins, he can never absolutely tell, in any particular case, where it will end. The high mortality from infantile syphilis is hardly to be deplored, as it evidences Nature's weeding-out process, and there are other reasons besides those of euthanasia that make the survival of the unfit undesirable.

Each physician must fill the *rôle* of health-officer in his practice in treating these patients, and by carefully worded advice urge those infected to abstain from spreading the disease; urge them to pursue a systematic course of treatment, and use all his authority to prevent marriage for some years after acquiring the initial lesion.

The great care that is now exercised in selecting wet nurses, as well as the increasing prevalence of the custom of infant feeding where the mother can not nurse the child, reduces acquired syphilis from that source to a very small figure. While the general custom of vaccinating with animal lymph has made vaccinal syphilis more rare than ever. It is by increased hospital facilities and the personal influence of physicians that we must expect a decrease of syphilis in this country, where regulative measures applying to one sex only and to a pariah-class are not likely to become general.

From a sociological and economical standpoint it is believed that the facts herewith recorded show that the United States has little to fear from syphilis. It has been shown that in England, by the most liberal calculation, the number of persons annually affected with syphilis would not exceed two per thousand of population. But as this calculation was based upon the general national mortality from that disease, as well as the mortality in hospitals in which numbers of syphilitic patients were treated, it may be confidently asserted that it is an overestimate, and that the prevalence of syphilis in the United States is much less than two per thousand of population annually. While the average period of disability, including as it does that due to all forms of the disease, is twenty-eight days for each person affected, the average cost of treatment and the average loss of wages during that period may be estimated at one dollar and seventy-five cents per diem, or, in round numbers, fifty dollars for each individual acquiring syphilis. In the aggregate, even if annually but one person in each thousand of population was infected with syphilis, there would be with our present population a loss of more than three million dollars per annum on account of this disease.

When we are confronted with the heavy loss that syphilis causes from the standpoint of dollars and cents, that, like that of pounds, shillings, and pence with our English brethren, is of such potent influence in

securing the enactment of sanitary reforms; and when we recall the disastrous influence that syphilis exercises upon the birth-rate as well as upon infant mortality, it may be asked whether we are justified in pursuing the *laissez-faire* procedures that have existed during the past. Conceding that syphilis is not increasing, and acknowledging the existing evidence that shows that it is not alarmingly prevalent, is it not sufficiently prevalent to urge us to make additional efforts to limit it besides those heretofore indicated? The first thought is, that the end desired may be attained by the regulation of prostitution, one-sided as such a measure may be. But it has already been shown that all legislation of this character has failed to accomplish the purposes for which it was enacted, and the numerous disadvantages associated with the system have been referred to by those familiar with its administration. Radical as the measures may be, no plan would be effective that did not embrace in its scope all the features included by Dr. M. E. da Cunha Bellem in the scheme presented to the International Medical Congress at London, that has been referred to in this paper. The omission of any one of the factors in that scheme would permit the introduction and spread of syphilis and invalidate the enforcement of the other factors, while the impossibility of applying these *in toto* is apparent to any one that will give them consideration.

It is on this account that, at variance with the impression that was entertained when the research for the preparation of this paper was commenced, it is not recommended that there should be regulation of prostitution by any plan that could be feasibly administered in this country. Rather than such a method as this latter, let all hospitals open their doors to the infected of both sexes, and thus endeavor to limit this preventable disease.

CHANCROID
AND ITS COMPLICATIONS.

EXPLANATION OF PLATE XXIV.

Fig. 1, chancroid in process of healing; suppurating bubo.

Fig. 2, gangrenous chancroid in negro; destruction of greater part of glans penis and of cavernous bodies.

Fig. 3, sloughing chancroid in mulatto.



Fig. 1.



Fig. 2.



Fig. 3.

CHANCROID.

By EDWARD MARTIN, M. D.

Definition.—The chancreoid has been variously named *soft chancre*, *simple chancre*, and *noninfecting sore*.

It is a contagious venereal ulcer, which when uncomplicated is not followed by constitutional symptoms. The term soft chancre is misleading, since these lesions are sometimes hard, and *per contra*, the syphilitic chancre, or true infecting sore, may be without induration.

Until the appearance of Bassereau's work (1852) the noninfecting and the infecting sores were alike classed as syphilitic, though it had long since been noted that certain of these sores were hard and were followed by constitutional symptoms; while others, soft as a rule and ulcerating freely, produced no effect on the system at large. Bassereau, basing his opinion upon a long series of confrontations, arrived at the following conclusion:

“No chancre which is followed by constitutional symptoms originates a purely local sore, nor does a local sore by contagion communicate an ulcer which is followed by syphilis.”

This doctrine excited bitter opposition, but with some slight modification was generally accepted. The contest which raged upon this subject, and which has now little more than historic interest, has left its trace upon the writings of the day in the preservation of the terms *unity* and *duality* as applied to the venereal ulcer—the former indicating the old teaching as to the common nature of all these lesions, the latter representing the modern belief on this point.

Although chancre and chancreoid essentially differ each from the other in etiology, course, and termination, the virus of each may be implanted upon the same spot at the same time. In such a case each virus produces its characteristic effect, but slightly modified by the presence of the other. The chancreoid develops first, and may run its course to complete cicatrization before the indurated erosion of the primary lesion appears; or, the chancreoid still persisting, induration may develop around it, to be shortly followed by typical inguinal enlargements. A developed chancre may become infected with the chancreoid virus, or the soft sore may be the entering point of the syphilitic poison. Such lesions—that is, those which are due to the action of both the chancreoid and syphilitic virus—are called *mixed sores*.

History.—Of the extreme antiquity of chaneroid there can be but little doubt. Ulceration of the genitals has been described in the most ancient writings. There is, of course, no clear evidence that such ulcers were not due to causes other than chaneroid, and it is possible they may have been syphilitic; but proof upon this point is wanting.

In the Ayurveda, the original of which is traced back by Hessler to more than one thousand years before Christ (Syphilis in Ancient and Prehistoric Times, F. Buret, p. 118), is found the following paragraph:

“Then, after excessive intercourse or a too great continence long after, one may have to do with a chaste woman who has not had sexual relations for a long time, and who has her courses, whose vulva may or may not be bathed in unhealthy secretion which becomes the seat of disease. If this man use excess with the woman, whether her vulva has or has not suddenly become a focus of corruption, the unhealthy humors engendered at the end of coitus may attack the penis, and whether the man be excoriated or not, they bring forth a pimple which is called the venereal disease.”

Among the Greeks, Romans, and Hebrews there are frequent allusions to lesions which correspond with the chaneroid. Celsus gives a description of both the soft and hard sores. Palladius (Hist. Lausiaca, vit. 32) describes a libertine who caught from a lewd woman an inflammation of the glans, as the result of which the whole of the genitals mortified and dropped off. The patient ultimately recovered, and subsequently led an exemplary life. In the furious outbreak of syphilis at the end of the fifteenth century chaneroids were frequently observed.

Etiology.—The dependence of chaneroid upon micro-organisms is now universally conceded. This is shown by the highly contagious nature of the pus, which retains its virulent properties in spite of extensive dilution with water or any neutral agent, and by the fact that bactericides, such as acids or sublimate, or even moderate heat, render the discharge innocuous. Before the germ theory these peculiarities of chaneroidal pus were clearly recognized, and were attributed to an irritating ferment engendered by lewdness and filth. Long before the acceptance of the germ theory, Donne (1835), quoted by Jullien (Maladies Vénériennes, 1879), attributed the lesion of chaneroid to an organism which he called *vibrio-lineola*.

To-day opinions vary as to whether chaneroids are due to the action of ordinary pus micro-organisms or to special micro-organisms not yet identified. On the one hand, it is held that these sores differ from ulcers observed on other parts of the body only from the fact that the anatomical and physiological conditions about the sexual organs peculiarly favor the development of the ordinary pus microbes. As opposed to this view, it is maintained that these sores run a course essentially different from that

characterizing a simple ulcer, and are in fact due to a specific micro-organism.

The principal arguments in favor of the chaneroid being a simple ulcer caused by the inoculation of ordinary pyogenic microbes upon an abraded surface, are the following: The discharge of a chaneroid can not be inoculated upon an unbroken skin surface. Examination of the discharge nearly always shows the presence of staphylococci or streptococci usually found in pus. Chaneroids are most frequently encountered, and exhibit their most perfect development, in persons most exposed to the invasion of the pyogenic microbes—i. e., in filthy and cachectic individuals. Inoculation with the pus of acne or furuncle may produce sores not distinguishable from chaneroid in appearance and in clinical course, and such sores may be repeatedly auto-inoculated. Moreover, different observers who have claimed the discovery of the pathogenic micro-organism have described different bacilli, and have, without exception, failed to offer the convincing proof afforded by inoculations of pure cultures grown on artificial media.

The arguments advanced in favor of the dependence of chaneroid upon a specific virus are, however, not to be despised. In addition to the pyogenic micro-organisms which are found in every open wound, competent observers have described other bacteria which are associated with these lesions, and which appear as pure cultures in repeated auto-inoculations practised under antiseptic precautions. In the vast majority of cases chaneroid arises from contact with the discharge of chaneroid, and not from retained decomposing discharges. The chaneroid runs its typical course in the persons of the most robust; often exhibiting no tendency toward self-limitation, and involving the anatomically associated lymphatic glands in degenerative processes with far greater frequency than is observed in simple suppurative processes. Auto-inoculation with the discharge of chaneroid is more often successful, and can be repeated more frequently, than is the case with ordinary pus. Such inoculation, practised under modern antiseptic precautions, may be repeated many times with the discharge of chaneroid, the ulcers after the second generation showing none of the pyogenic micro-organisms, but only those which are held to be specific to the lesion. Repeated inoculation of ordinary pus often fails, or, if successful, produces a slight and evanescent lesion. Such inoculation can not be indefinitely repeated under antiseptic precautions. A rapidly extending chaneroid, if thoroughly cauterized, is at once converted into a simple ulcer; and though in the discharge of the latter pyogenic microbes abound, yet the lesion runs a benign and self-limited course, essentially different from that characteristic of the chaneroid.

Claims for the discovery of the alleged specific microbe of chaneroid

are by no means of recent date. Didier and Salisbury (quoted by Bumstead, *The Pathology and Treatment of Venereal Diseases*, 1870) each described a different microbe, which was regarded as the specific cause of the lesion. Ferrari (*Annales de Dermatol. et de Syphilig.*, 1885) states that the specific organism of chancre is a bacillus a little smaller than the tubercle and lepra bacilli. These micro-organisms are readily colored with methyl blue, and are always found in the discharge of recent typical sores.

Luca (*Gaz. degli Osped.*, 1886) is the first who claims to have discovered by modern methods of bacteriological research the specific micro-organism of soft chancre. He was able to cultivate diplococci and streptococci, which by inoculation produced typical chancroids. He stated that the bubo complicating chancre differed in accordance with the form of infection. Simple bubo, he held, was due to the ordinary pyogenic bacteria, while the ulcerating bubo was the result of the direct action of the specific microbe, developing chancroidal inflammation only after opening, because the microbe is an aërobie (*Cong. internat. de Dermatol. et de Syphiligraphie*, Paris, 1889, *Comptes Rendus*).

Ducrey stated that the presence of streptococci and staphylococci in chancroidal sores is due to secondary infection. When antiseptic precautions were observed in auto-inoculation, these secondary incidental micro-organisms gradually disappeared from generation to generation, until finally none were found in the fifth or sixth transplantation. Inoculation on nutrient gelatin gave negative results, although implantation on the surface of the body caused typical soft sores. He concludes that the pure virus contains only one micro-organism, which is short and thick, with rounded ends, looking much like a figure of eight, and is found in the protoplasm and between the cells, often in chains and groups. It is colored by alcoholic solutions of fuchsin, methyl violet, and gentian violet. In the pus of buboes he never found any micro-organism, and he asserts that soft chancre always causes a simple bubo, the chancroidal variety occurring only as a result of infection after operation. He believes that the bubo is the result of the destructive action upon the glandular tissue of the chemical products engendered by the micro-organism of soft chancre.

Welander (*Versuche einer Abortivbehandlung der Bubonen*, *Archiv für Dermatol. u. Syph.*, 1892) has found micro-organisms corresponding to those described by Ducrey, but not invariably, and always in very small numbers.

Krefting (*Ueber die für Ulcus Molle spezifische Mikrobe* *Erganzungshefte zur Archiv für Dermatol. u. Syph.*, 1892) conducted a series of elaborate investigations to test the truth of Ducrey's findings. In all, he examined twenty-three patients. Before inoculation the skin was washed

with sublimate and ether, and usually the inoculated surface was covered in by a sterilized watch-crystal, which was held in place by means of cotton collodion and a gauze bandage. Through this transparent cover the development of the pustules could be watched. In most cases the inoculation pustules were continued to the seventh or eighth generation, in each case three points of inoculation being made. The contents of the pustules were examined microscopically two or three days after inoculation, before the crusts formed. The staining solution was as follows: Five-per-cent borax solution, sixteen grammes; saturated aqueous solution of methyl blue, twenty grammes; distilled water, twenty-four grammes.

Although other dyes show the micro-organisms, the solution of borax and methyl blue is preferable, since it does not overstain the protoplasm of the pus-cells, and thus renders easy the detection of the bacilli which usually lie in these cells. Culture experiments on artificial media invariably give negative results.

Cover-glass preparations were flamed in the customary way and were allowed to float in the dye for half an hour. After washing in distilled water, the preparations were dried and examined. The discharge from the ordinary ulcerating soft chancres was not examined microscopically, since here mixed infection is constant. In all the preparations examined as described above the bacilli were found, one and a half to two millimetres in length and half to one micromillimetre in breadth. These were short, thick, with rounded ends, and frequently appeared as though compressed in the middle, much resembling dumb-bells in shape. They were found in groups or singly in the protoplasm of the cells, or singly between the cells. In some pustules of the first and second generations other bacteria were observed. Streptococci and staphylococci were found only in the first generation. Whether the inoculations were practised with or without antiseptic precautions in two-day-old pustules, the same bacilli were constantly found almost always as pure cultures. In private patients the bacilli were very much more numerous in the second and third generation. This, Krefling attributes to their being treated while the chaneroid is still recent and the virus still vigorous. In no instance was the author able to produce a pustule with inoculation of the discharge of a soft chancre without finding the bacillus already described. In pustules produced by inoculation of other materials—such, for instance, as the discharge of a syphilitic ulcer of the prepuce—only diplococci were observed. These pustules could be reinoculated, but caused no destruction of tissue, and dried up in about eight days. Another case of syphilitic ulcer inoculated showed almost every form of bacteria commonly found in pus.

Unna (*Monatsheft für Praktisch-Dermatol.*, Bd. xiv, No. 12) states that he has demonstrated the micro-organism of chaneroid in five success-

ive cases, and that he is convinced that this is the specific bacillus, because it is found in all the typical sores which he excised, it is found in the tissues without the admixture of other micro-organisms; it is distributed in such a way as to most logically account for the histological and clinical symptoms characteristic of the chancre; it is not found in simple ulcers nor in the initial sclerosis.

This bacillus is found in short or long chains lying in the lymphatic spaces, but not occupying the protoplasm of the leucocytes. It is a streptobacillus and, according to Unna, may be identical with the micro-organism described by Ducrey, though to the reader of Unna's article the only points of similarity would seem to be that each investigator has found a bacillus which can not be cultivated on artificial media.

Jullien (*Annales de Dermatol. et de Syphilig.*, May, 1892), in the hope of verifying the findings of Ducrey and Krefling, as to the presence of a pathogenic microbe in chancre, practised auto-inoculation upon two patients, both suffering from typical chancres. The seat of inoculation was prepared in accordance with modern antiseptic principles, was thoroughly washed with soap and water, then successively bathed in solutions of microcidine, corrosive sublimate, carbolic acid, and finally in absolute alcohol; the point of inoculation was protected by means of a flamed watch-crystal, or by a sterilized cotton pad. The whole area was covered in by a sterile dressing. He was unable to carry these auto-inoculations in either case beyond the third generation.

Microscopic examination of the pus of the original chancre showed microbes in great abundance and variety. The secretion of the inoculation pustules, however, showed absolutely no micro-organisms, although these secretions still retained some of their virulence. This shows, according to the author, quite conclusively, that the numberless micro-organisms observed in the secretions of the original chancre have nothing whatever to do with the virulence of this lesion. He does not doubt that a specific micro-organism exists, but was absolutely unable to find the microbe described by Ducrey and Krefling.

Strauss obtained the same results as Jullien. He was unable to continue auto-inoculations beyond the fourth and fifth generations, although Ducrey and Krefling repeated these inoculations ten or fifteen times, and he never found the micro-organisms described by the latter authors.

A review of the bacteriological evidence as to the discovery of the specific micro-organism of chancres leaves the question still *sub judice*. The bacillus found by Ducrey, the presence and the virulence of which was confirmed by the research of Krefling, although easily stained, and hence readily discovered, escaped the careful search of Jullien. Unna and Ferrari's description of the bacilli found by them are so vague that it is

impossible to determine whether they tend to corroborate or disprove Ducrey's and Krefling's findings.

The fact that the discovery of the specific microbe can not yet be regarded as proved, by no means shows that the lesion is not due to such a microbe. The belief that syphilis is due to a pathogenic microbe is almost universal, yet the bacterium has eluded every method of modern research. Fournier says that when a chancroid is found there has been deposited pus from another chancroid under conditions favorable for its absorption. Keyes says that chancroid is always due to inoculation of pus derived from a similar ulcer. No amount of sexual excess, no degree of ulceration, no traumatic or chemical irritation, however prolonged, no simple or poisonous ulceration from other specific source (syphilis, cancer, glanders, etc.), nothing, in short, can produce chancroid except chancroid.

As opposed to this view Taylor thinks it is generally accepted that the chancroidal pus contains the staphylococcus, pyogenes, aureus, and albus, perhaps the streptococcus, and that it is not dependent upon a specific microbe. Finger (*der Syph. u. der Venerischenkrankheiten*, 1888, p. 181) says that the generally accepted theory of the day upon this subject is, that the soft chancre is simply due to inoculation with pus, since pus, under favorable circumstances, is able to produce in all persons inoculable sores.

The whole question as to the dependence of chancroids upon pus microbes or upon a specific microbe is still an open one. The corroboration or disproof of the findings of Unna and of Ducrey and Krefling is comparatively easy, but even this will not leave the matter more definitely settled than before. I believe that ultimately the specific microbe will be found.

Inoculability of Chancroid.—It seems to have been fairly well shown that the virulent properties of the chancroidal discharge are found in the pus-cells, since inoculation with the discharge from which pus-corpuscles have been filtered out is not followed by the development of the typical sore. It also seems well proved that chancroid is capable of inoculation indefinitely repeated. Some experimenters have reinoculated themselves thousands of times, each inoculation being followed by a positive result. Syphilization—a practice founded upon an imperfect knowledge of the distinction between chancroid and chancre, and now happily only of historical interest—has shown that after a certain time the skin acquires immunity against chancroidal inoculation, and also that different parts of the body show varying susceptibilities to the action of the pus. The immunity is, however, only temporary, one attack of chancroid protecting not in the slightest degree against another. Although it is true, as a general rule, that during the entire existence of the chancroid, in-

plantation of its discharge upon erosions or excoriations of the skin or mucous membrane will produce chancroids, in proportion as the original sore grows older the virulence of its discharge grows less. At the period of healthy granulations, when the sloughing process has ceased, this virulence practically may be said to cease. The inoculations practised at later periods produce pustules and ulcerations which are less and less typical. Successive inoculations have a tendency to become milder, so that as a rule it may be said that the original pus of each chancroid is capable of auto-inoculation, which can be repeated only a limited number of times.

The result of inoculation varies not only with the age of the chancre, but also depends upon the position selected for auto-inoculation. Thus, when these inoculations are made upon the thigh, large sloughing ulcers not infrequently result. The same pus inoculated upon the belly produces much more manageable lesions; while if the chest, arms, or face are selected, the lesions are still less serious.

Finger and others teach that many acute diseases, such as pneumonia, pleurisy, and eruptive fevers, during their course render the patient immune to inoculation with the chancroidal virus. This is disputed by Keyes, who states that such diseases do not furnish immunity.

Frequency of Chancroids.—Of the three venereal diseases, syphilis, gonorrhoea and chancroid, the latter is by all odds the least frequent, though if cases of primary lesion alone are considered, chancroid is, according to statistics, more common than chancre.

Comparative tables designed to prove the relative frequency of chancroid and chancre show, according to Sturgis's collection (*International Encyclopædia of Surgery*, vol. ii, p 334) of a total 13,572 cases, that 10,337 were suffering from chancroid and 3,235 from chancre.

The records of my own service show that the local sore—that is, chancroid—was less frequent than chancre. Last year, in the Venereal Dispensary of the University of Pennsylvania, 591 purely venereal diseases were treated. Three hundred and forty of these suffered from gonorrhoea, 110 from syphilis, and 95 from chancroid. The only authors agreeing with this statement in the tables quoted by Sturgis are Belhomme and Martin.

Although the hospital records generally show that chancroid is more frequent than chancre, and hence, given a patient with sores about the genitalia, the odds are in favor of the sore being chancroidal, such a deduction can not be drawn in private practice where the chancre is encountered quite as frequently, as the soft sore, if not more so. The reasons for this are sufficiently clear, and have been especially dwelt on by Fournier. The patients who apply to the hospitals for help are usually the poor, ignorant, and uncleanly, those given to excesses and accustomed to consort with the lowest and most depraved women of the

town. Such patients are careless of themselves, and indifferent as to the condition of the partners of their pleasures.

In my venereal service two thirds of the ninety-five chancroids observed in the last year came from one block in Philadelphia. Nearly every house in this block is filled with dirty, drunken women, who earn their living from the passing strangers. The houses are placed near the river front, and are particularly popular with sailors. The majority of these women whom I examined were old syphilitics, hence immune to the attacks of this disease and free from contagious specific lesions. They, like their partners, customarily exhibited chancroids. Many of the young women were, however, suffering from chancres and secondaries; hence syphilis originated more frequently from this focus than from all the other parts of the city combined.

The well-to-do, those who consult the surgeon in his office, are protected from chaneroid by their cleanliness and general healthy condition; by the fact that they would probably detect a lesion as gross and superficial as that characteristic of the chaneroid; and also because the women with whom they consort promptly seek medical relief for any external inflammatory disorder from which they suffer. Even in dispensary practice, however, syphilis in one or another of its phases is much more frequent than chaneroid. The chanere relatively is less frequently met with, because it causes such slight inconvenience that the ignorant unwashed either do not see it at all, or do not consider it necessary to seek medical advice for such a trivial lesion.

The chaneroid is usually multiple. In Sturgis's collection of 950 cases, 265 were single, and 685 were multiple. Of 502 cases of chancre, 386 were single and 116 multiple.

Location of Chaneroid.—The chaneroid may be placed upon any portion of the skin or orificial mucous membranes.

Its usual location is on the genitalia, and it is not infrequently observed in and around the anus, about the buttocks and on the thighs. Cases have been reported where the sores attacked the mucous membrane of the mouth, the nose, the conjunctiva, the scalp, the fingers, and the urethra.

According to Sturgis, the extra-genital chaneroid occurs in about the same percentage of cases as does the extra-genital chanere. His statistical study does not seem to prove this statement, nor is it in accordance with the experience of the genito-urinary surgeon, to whom, if the peri-genital region be excepted, extra-genital chaneroid is a lesion of great rarity. The genital chancroids in the male are usually found upon the glans and prepuce. The favorite position is at or near the frænum. This is because this region is particularly exposed to abrasion during sexual congress, and the sulci at its sides are difficult to cleanse.

Of one hundred and sixty-two cases observed in the University Hospital Venereal Department, thirty-seven involved the frænum, thirty-four the præputial mucous membrane, and thirteen the dermal layer of the prepuce; twenty the glans, fifteen the sheath, two the peno-serotal junction. There were no cases of extra-genital chaneroid, and but one instance of chaneroid of the meatus. Of the twelve hundred and seventy-one cases of chaneroid in the male collected by Sturgis, the very large majority were observed upon the glans penis, the prepuce, the fossa glandis, and the sheath of the penis; twenty-four were of the meatus urinarius, nine were of the urethra, nine upon the serotum, and thirteen were extra-genital. Of these, three were about the anus, three were on the finger, five on the anterior thoracic region, and one on the nates.

Finger states that the points of predilection for the invasion of the chaneroid are in males the coronary sulcus, the urethral orifice, the margin of the prepuce; in females, the margins of the greater and smaller labia. This statement is not borne out by my own observations. Chaneroid of the urinary meatus is less common than chanere of this region, and involvement of the præputial margin in the chaneroidal ulceration is not so frequent as development of the sores at or near the frænum. Urethral chaneroid is usually due to extension of the lesion backward from the meatus. Sores very rarely develop primarily back of the meatus. In such a case the symptoms would closely resemble those of gonorrhœa.

In women the fourchette and the inner surface of the labia majora and minora are particularly prone to exhibit chaneroidal lesions. The sores have also been observed at the urinary meatus, on the surface of the vagina, and on the cervix uteri. In women, anal chaneroid is far more frequent than in men; this not because of unnatural practices, but rather because contaminating discharges flow backward from the vagina, invading cracks or fissures which may be present about the rectal opening.

The *extra-genital chaneroids* are by no means rare. Those upon the fingers and hands are occasionally observed, but very few cases of cephalic chaneroid have been described.

Taylor narrates the case of an Irishman with an exceptionally long prepuce, phimotic, suffering from multiple marginal chaneroids. These sores were about two weeks old. A subpræputial injection of dilute carbolic acid was given. Five days later there was observed directly over the outer margin of the left supraorbital arch, a thick, greenish-brown crust a half inch by one and a half inch in extent; around this were placed a number of smaller crusts. There was a marked inflammatory aureola, but no purulent discharge. The left eye was entirely closed, from œdema of the upper lid. The patient stated that he received a cut in this region incident to a fall. After two days this wound received

practically no dressing. He then suffered from pain and swelling. On removal of the crusts two chancroids were exposed, one running a rapid destructive course. Successful auto-inoculations were practised. The entire wound was cauterized with fuming nitric acid, and healing promptly followed.

Puche narrates a case, which Ricord freely accepted, in a man twenty-eight years of age, who presented himself suffering from a circular ulcer on the inner surface of the lower lip. This presented all the appearance of chancroid, and lasted for three or four days, having appeared eight days after unnatural sexual relations. Auto-inoculation was successful in this case.

The existence of chancroid upon the head or in the buccal cavity was at one time doubted, but this has been abundantly proved both by clinical observation and experimental inoculation. As a practical point, however, it should be borne in mind that the simple venereal sore is in these regions so rare as to constitute almost a surgical curiosity. Fournier's collection of one hundred and fifty-eight cases of cephalic sore fails to show a single undoubted instance of chancroid.

Varieties of Chancroid.—When the chancroidal virus obtains entrance through a follicle, the lesion first formed very much resembles an ordinary furuncle. There is a hard, dusky-red, elevated, painful papule, which shortly ulcerates and is converted into a typical round, punched-out ulcer. This is called a *follicular chancroid*, and is always attended, at least in the beginning, with marked peripheral infiltration.

If at the time of contagion there is an erosion, or loss of continuity of the surface from any cause, the whole eroded surface usually becomes chancroidal and the shape of the ulcer is very irregular, dependent upon the original outlines of the erosion. Such lesions, especially if large, are usually more superficial than the follicular chancroids. The surface of the ulcer is irregular and worm-eaten, and is covered with a grayish, diphtheroid pseudo-membrane formed of necrotic tissues infiltrated with pus. Peripherally there is an inflammatory areola; it is not indurated to the extent noted in syphilis.

In patients who are watchful of their symptoms the first manifestations of local trouble may appear in the form of a vesicle which is termed the *herpetiform chancroid*, and in reality is the earliest stage of the sore, before there has been sufficient time for the vesicle formed at the site of inoculation to become converted into a pustule or an ulcer.

When the chancroid is characterized by the formation of crusts due to drying of the secretion, it is termed *ecthymatous*.

A chancroid characterized by marked inflammatory induration is termed *uleus elevatum*. The induration may at times simulate so closely chancre that diagnosis from examination of the sore alone is almost impossible.

When from irritation, or because of impaired tissue resistance, the inflammatory symptoms become intensely marked the lesion is termed *inflamed chancre*. If this inflammation runs on to marked extension and tissue destruction, the lesion is termed *phagedenic*. Where the tissue destruction is extensive, the chancre is termed *gangrenous*. When the lesion becomes chronic, involving a large surface and extending in one part while cicatrization is taking place in another, it is termed *serpiginous*.

Pathology.—Microscopic examination of the chancre shows a marked small cell infiltration undergoing granular degeneration. This forms the foundation of the ulcer. It involves the corium, and is somewhat sharply limited in depth, but laterally it extends considerably beyond the ulcer, invading the papillæ still covered with epithelium. The papillæ which closely surround the ulcer are club-shaped, elongated, and widened. The inflammatory infiltrate exhibits a reticulum in the meshes of which numerous embryonal and epithelioid cells are held. It occupies the adventitia of the blood-vessels, which are dilated and are increased in number. Lymph-vessels are also very numerous. Injections of the lymphatics practiced after circumcision, necessitated by a phimosis dependent upon chancre, show that this system forms a close network in the infiltrate and extends even to the ulcer, some of these vessels opening directly at this point, so that if by means of a hypodermic syringe an injection is thrown into the healthy tissues two fifths of an inch from the border of a chancre, without employing the least pressure, the injection material will flow from the surface of the sore very much as would be the case if a similar injection were made in the substance of a sponge (Letzel, Finger).

The Clinical Features of Chancre.—The development of a chancre from the time of its inoculation to the formation of the typical sore has been thoroughly studied, since the capability of inoculating the virus and the popularity of this procedure have given many competent observers abundant opportunity to study the question.

Such inoculation is now used only for diagnostic purposes. When the discharge is inoculated upon the same person from whom it is taken, it is called auto-inoculation; when it is practised upon another person, it is called hetero-inoculation.

The inoculation chancre is generally placed on the sides of the chest below the nipple line, since here experience has shown that the resulting sore is manageable, and that there is slight danger of producing destructive lymphadenitis. In making these inoculations the selected area should be cleansed by means of repeated washings, first with soap and water, then with ether, and finally with boiled sterilized water. The surface is dried by means of sterilized cotton and is inoculated. Inoculation is accomplished by moistening the point of a scalpel in the discharge of a

chancre, passing this point perpendicularly down to the true skin, rotating the knife on its long axis, and rubbing in as much of the discharge as remains on the sides of the blade. A watch-crystal is then placed over the site of inoculation, undue pressure from its edge being prevented by a little absorbent cotton; this dressing is secured in place by means of rubber adhesive straps. Thus the observer is enabled to watch without difficulty the course of the inoculation.

In from one to four days an inflamed pustule develops. On removing the epidermal covering of this, there is exposed a ragged, punched-out, undermined ulcer presenting a greenish or gray irregular floor circular in outline and penetrating nearly if not entirely through the thickness of the skin. This ulcer extends with more or less rapidity for several weeks, then remains stationary for a time, finally undergoes involution, ultimately healing and leaving a cicatrix. In case the epiderm covering the original pustule is not removed, there is a tendency to form thick crusts, beneath which the ulcer steadily extends. From the result of inoculation Bumstead concludes that—

1. The chancre has no period of incubation; that the pathological process is set up the moment that the virus is introduced beneath the epidermis.

2. That the chancre first appears as a pustule, but that it ordinarily consists in an ulcer underlying the elevated epidermis and presenting the characteristics above stated.

3. That the chancre is capable of healing spontaneously without the intervention of art.

The inoculation chancre may be said to present the sore in its typical form. The history of chancres acquired in the ordinary way—that is, by sexual contact—differs in some points from that of the inoculation sores. This, however, is mainly dependent upon the fact that such sores are not subjected to accurate scientific observation. Thus, while the inoculation chancre has no period of incubation, careful examination as to the time elapsing between exposure to contagion and the development of the ulcer in clinical practice would show a distinct period of incubation in a certain proportion of cases.

This is usually because the beginnings of the sore are not noticed. The pustule is superficial, and the patient is not aware of the existence of the lesion until the ulceration is fairly extensive. Indeed, I have exposed upon the surface of the glans a typical chancre the size of the little finger nail, and one which was certainly seven to nine days old, the presence of which was a revelation to the patient.

Fournier found that in the great majority of his cases, even following the statements of the patient, the period elapsing between exposure and detection of the sore was not greater than one week. In some few cases

the lesion did not appear for two weeks, or even three weeks, after exposure. In my hospital records the average incubation was one week. In a few cases I have seen in private practice the average incubation was less than three days, this tending to show that there is in reality no period of incubation, failure to detect the lesion depending upon carelessness on the part of the patient. Ricord explains the cause of late contagion upon the ground that the virus is deposited upon healthy surfaces, these later become eroded, allowing the virus to obtain entrance and to produce its characteristic effects.

The pustule with which the chancroid begins is rarely observed, the lesion first appearing as an ulcer, which is either crusted or open and is freely secreting. This lesion is usually rounded in shape, though when a hair-cut or an abrasion has been inoculated, or when it attacks the folds of the anal mucous membrane, its outline may be very irregular. It is frequently undermined, with a worm-eaten surface, of a yellowish-gray color, and is surrounded by an inflammatory areola.

The chancroid if untreated extends in depth and circumference for about four to six weeks. At the expiration of this time granulations become healthy, and in one or two weeks the lesion cicatrizes.

Diagnosis.—The characteristics upon which a diagnosis of chancroid is founded are—

1. Absence of a distinct period of incubation.
2. The location, development, appearance, and number of the lesions.
3. Auto-inoculation.
4. Absence of an indurated base.

It has already been shown that chancroid may not develop for many days after exposure. This, however, is most exceptional, the lesion usually appearing within a few hours, or at most a few days.

It is unfortunately the rule that, even though the patient be accurate and unreserved in his statements, not much help is given by the history of the case, since there have been frequent exposures at varying intervals before the appearance of a sore. A clear history of incubation of less than twelve days, when obtainable, suggests very strongly the chancroidal nature of a sore.

Lesions located elsewhere than on or about the genitalia or in the region of the anus are probably not chancroidal, though a few recorded cases, and particularly the history of inoculation, show that the virus may cause its characteristic lesions on any cutaneous or mucous surface.

The development of the lesion is characteristic. There is first a vesicle, which in twenty-four hours becomes converted to a pustule, discharges, and exposes a rounded, ragged, punched-out ulcer. When an abrasion is infected this becomes inflamed, suppurates, and forms an unhealthy ulcer, corresponding in shape to the original lesion.

The appearance of the lesion is usually the most reliable diagnostic feature. The punched-out, round, irregular, or ragged, often undermined ulcer, which spreads rapidly, secretes freely, is frankly inflammatory in type, and exhibits an unhealthy diphtheroid, worm-eaten surface, can scarcely be confounded with any other lesion. It is rather the atypical sores which may cause confusion. Thus the chronic chancre which forms at times upon the external genitalia of women may readily be mistaken for a chancre, since it is indurated, shows no symptoms of acute inflammation, and heals very slowly. Not infrequently, either through the resistance of the tissues inoculated or weakness of the virus implanted, the chancre remains purely superficial, approaching in type a simple erosion or the lesion of herpes rather than that of a deep and extending ulceration.

The fact that lesions are multiple, one sore developing after another, particularly on healthy surfaces opposed to the original lesion—as, for instance, upon the skin of the scrotum at a point touched by a chancre of the frænum—is characteristic of chancre, though any focus of suppuration may produce inflammatory reaction by inoculation. Chancre may be multiple, but in such cases inoculation at all the involved points took place at the same time, and the development of the lesions is synchronous, or very nearly so. Inoculation of a surface touched by a chancre rarely takes place, and when observed the resultant sore does not resemble the original lesion, being due to implantation of the ordinary pus microbes.

Auto-inoculation is by no means an infallible test, since when practised under modern antiseptic precautions it has repeatedly failed to produce a sore more typical than that resulting from the discharges incident to ulcerating venereal warts or other non chancreal lesions. If the commonly accepted doctrine as to the dependence of chancreal lesion upon the ordinary pyogenic micro-organism be accepted, auto-inoculation as a means of determining whether a lesion is syphilitic or chancreal in nature is practically worthless, since the suppuration from a true chancre, though slight, is due to the same cause as that from a chancre; hence, with some modifications possibly dependent on the virility of the micro-organisms and the vitality of the patient, inoculation from a chancre or a chancre might be followed by the development of the acute ulceration heretofore deemed characteristic of chancreal virus. Occasionally the inoculation chancres attain greater dimensions and are more rebellious to treatment than are the original lesions for the diagnosis of which inoculation was practiced.

The absence of induration is also a sign upon which too much dependence can not be placed. When local inflammatory phenomena are markedly acute in type there is developed an inflammatory induration so

like that attendant upon certain forms of chancre that distinction between the lesions on this point alone is a matter of very great difficulty, or is even quite impossible. This induration, it is true, is not sharply circumscribed, is generally attended with œdema, and on firm, continued pressure the general shape of the infiltrate can be altered, differing in all these respects from the induration of chancre. The absence of infiltrate by no means proves that a given lesion is chancroidal. Thus certain chancres are not infiltrated, and herpes, the lesions of balanoposthitis, and simple abrasions are habitually free from peripheral hardening.

The most important practical consideration in the examination of chancroid is to distinguish it from true chancre. The salient features of each lesion on the recognition of which a differential diagnosis is founded have already been fully considered in another part of this work, but it is not amiss here to recall the fact that we have absolutely no reliable sign or symptom upon the basis of which such a differential diagnosis can be made with certainty. If a specific micro-organism of either syphilis or chancroid were identified, the differential diagnosis would be as readily made as, for instance, is that between simple and gonorrhœal urethritis. As it is, a differential diagnosis must be based upon the presence or absence of several elements of the symptom group characteristic of the syphilitic or chancroidal sore. Of all means of diagnosis, the most reliable is probably confrontation and a clear history as to the interval elapsing between exposure and the development of lesions. Even the inguinal lymphadenitis may fail as a means of diagnosis. In chancroid, two or even three glands of one side may increase to three or four times their normal size, become almost cartilaginous in density, and slowly subside without suppurating, while suppurating inguinal lymphadenitis in cases of chancre is by no means rare. Scrapings from the two lesions sometimes throw light on the diagnosis, those from the chancre containing epithelium, those from the chancroid exhibiting granulation tissue. But in case of a deep chancre and of superficial chancroid this may be exactly reversed.

The *mixed chancre*—that is, a lesion resulting from inoculation with the chancroidal virus and that of syphilis at the same point—exhibits the characteristics of both sores. If both inoculations take place at the same time, the chancroid will have run its course to the healing stage before the induration and adenitis characteristic of syphilis develop. A well-developed chancre is, however, not exempt from chancroidal inoculation, nor is it impossible for the micro-organism of syphilis to obtain entrance into the system through the breach of continuity incident to chancroid.

In such cases a differential diagnosis can scarcely be made.

It follows that, even though a perfectly typical sore is encountered, it is not safe to assert positively that syphilitic infection has not taken place.

Herpes, follicular abscess, balanitis and balano-posthitis, abrasions or hair-cuts, are scarcely to be differentiated from chaneroids at the time beginning inflammation first attracts the patient's attention to them. In one or two days, however, the superficial nature of the lesions and the prompt yielding to treatment show the absence of chaneroidal poisoning.

An ulcerating papular syphilide attacking the genitalia may closely simulate chaneroid; but here the history of the case, the appearance of the lesion, which is not punched out, and particularly the presence of the eruption on other surfaces of the body, would show the true nature of the local lesion.

Ulcerating gummata of the genitalia may exactly simulate chaneroid in appearance. The history of an induration preceding ulceration, the slow progress of the case, and the absence of acute inflammatory symptoms and of glandular involvement, would suggest the syphilitic nature of the affection.

The tuberculous ulcerations of the penis are most difficult to diagnose from chaneroid. The slow progress of the case, the identification of miliary tubercles about the periphery of the lesion, the detection of tubercle bacilli in scrapings, and the presence of tuberculous lesions in other parts of the body, will lead to a correct diagnosis.

The *extra-genital chaneroids* are rarely recognized as such. No doubt they are more frequent than the number of reported cases would suggest. This is probably because they are not referred to venereal specialists for treatment, but are under the care of the general practitioner, who confounds them with other lesions. Their development and clinical history is not materially different from that of the genital chaneroid.

THE COMPLICATIONS OF CHANCROID.

The complications of chaneroid are :

1. Lymphangitis and lymphadenitis (bubo).
2. Phimosis and paraphimosis.
3. Excessive inflammation, sloughing, and gangrene.

Lymphangitis, or inflammation of the lymphatic vessels, is a rare complication of chaneroid. In the great majority of patients suffering from chaneroidal buboes the lymphatic vessels which carry the irritating products from the ulcer to the involved gland are not appreciably affected.

When these vessels are involved, there can usually be felt one or more tender, indurated cords passing along the dorsum of the penis. The inflammation involves the perivascular tissues, so that they become infiltrated and oedematous, the overlying skin is usually reddened and adherent to the band of inflammatory exudate below, and knots may form in the course of the lymphatic vessels, which are prone to suppurate and ulcerate, sometimes being converted into true chaneroids.

Bubo, or Lymphadenitis.—Bubo is by far the most frequent complication of chancre. Sturges states that it occurs in about thirty per cent of cases. Letzel says that about ten per cent of chancroidal cases suffer from this complication. The records of my venereal service show that of one hundred and sixty-two cases of chancre, bubo occurred in thirty-one, or a little over nineteen per cent. Of these thirty-one cases of bubo, sixteen occurred as a complication of chancre of the frænum. Thirty-four cases of chancre of the reflected layer of the prepuce were complicated by bubo in four instances. Chancroids placed on other surfaces of the genitalia were followed by buboes very exceptionally. This by no means represents the percentage of buboes which will be encountered in private practice. The cases which apply to hospitals for relief, and on which statistics are founded, represent the class who from neglect, exposure, and malnutrition are particularly prone to involvement of the glands. Among the well-to-do, who are cleanly, observant of directions given, and who apply for treatment early, bubo will not occur in five per cent of all cases.

Etiology.—The etiology of bubo is not entirely clear. It by no means depends upon the extent or clinical features of a chancre. Those sores which are most destructive are not necessarily attended with inflammation of the lymphatic glands. Indeed, it is possible for sloughing of the entire penis to take place with little or no involvement in the direction of the lymphatics. On the contrary, the most insignificant lesions may be accompanied by multiple suppurating buboes, and, indeed, the latter may develop after the chancre has been completely cicatrized.

Usually one or more glands of the affected side are involved. Sometimes the involvement is upon the side opposite to that of the lesion, and not infrequently tumors are found in both groins. This is particularly the case when the lesion involves the frænum; and, indeed, chancre in this location is more frequently complicated by bubo than is the case when it involves any other surface of the body. Buboes are particularly liable to complicate chancroids when the latter are not carefully treated from the beginning. Constant bodily activity, especially that which tends to irritate the chancre, or lack of cleanliness, or retention of discharge, such as occurs when the lesion is allowed to scab over, or when it attacks the glans penis or the inner surface of the foreskin in the case of a phimotic, irritation of the lesion by applications not sufficiently strong to cause total destruction of the diseased parts yet sufficiently powerful to occasion inflammatory reaction, are strong predisposing factors in the development of bubo. *Per contra*, cleanliness, quiet, careful, repeated antiseptic dressings, prompt removal of discharge, will render the occurrence of lymphadenitis a rare exception.

Bubo may develop at any time during the course of a chancre, or some weeks after its complete cicatrization. It is usually located in the

glands which receive lymph from the genitalia, since it is on the latter that lesions are usually found. The glands commonly involved are the superficial inguinal glands found below Poupart's ligament. Involvement of the glands lying below the saphenous opening and those lying in the pubic region is rare.

The theory is commonly accepted that buboes are due to micro-organisms, which are readily carried into the lymphatic system, owing to the fact that the terminal vessels open directly upon the ulcerating surface of the chaneroid. These micro-organisms are supposed to be carried through the vessels and to produce no marked effect until they reach the gland, where by multiplication and irritant action on the tissues they produce either a hyperplastic inflammation or suppuration. Buboes have been classified as *simple* or *chaneroidal*, dependent upon the presence in them of the micro-organisms of suppuration or of the specific virus of chaneroid. The *simple bubo* either undergoes resolution, or, if it suppurates and is opened, heals as would a suppurative adenitis due to an ordinary infected wound. The *chaneroidal bubo* causes extensive destruction of tissue, and on being opened forms a sore offering all the clinical features of the chaneroid from which it was inoculated.

Bacteriological research does not, however, justify the belief just given as to the etiology of buboes or their classification into simple and chaneroidal. Repeated microscopic examinations of the contents of suppurating buboes have absolutely failed to show the presence of any micro-organisms, and auto-inoculations practiced with this discharge have not produced characteristic lesions. Thus Strauss demonstrated in two cases that inoculations with the pus of buboes were followed by no results, although control experiments with secretions of the soft chancre were successful. In no case where the bubo was treated antiseptically after opening did it take on a chanerous form after ulceration. He held that the bubo primarily was never virulent, but only became so by secondary infection after operation.

It is true, both Krefting and Horteloup state that they have practised inoculation from the discharge of buboes with positive results. One of the cases on which Krefting bases his opinion—namely, that the bubo may sometimes contain the specific virus of chaneroid—presented himself with a suppurating, discharging bubo of the left groin, and a fluctuating tumor of the right groin the size of a walnut. The patient had been exposed to contagion two months before, and in four days developed two ulcers in the coronary sulcus. The open bubo had developed three weeks before the patient was seen, and had discharged for two weeks. The bubo in the right groin began to develop two weeks before the patient presented himself. The discharging bubo had not been opened till two weeks after the chaneroids were completely cicatrized. Twelve inoculations made from

the pus taken from the bubo in the right groin gave negative results, and microscopic examination of the contents of this bubo failed to show micro-organisms. Inoculations from the opened bubo of the left groin gave positive results.

Krefting holds that in this case the bubo could not have been inoculated secondarily, since the original chaneroid was healed three weeks before the bubo was opened.

In another case presenting a characteristic chaneroid on the outer surface of the prepuce, a red, tender, nonfluctuating bubo the size of a walnut was found in the right groin. Inoculation with the secretion of the chaneroid gave positive results. The chaneroid was excised and the resulting wound was closed by suture, and the bubo was protected by a sterilized cotton dressing which was held in place by a bandage; eleven days later the bubo opened spontaneously. Inoculation practised with the discharge from the bubo caused typical ulcers, and microscopical examination showed that the specific micro-organisms were abundant.

Observations upon another case seemed to show that not only is the pus of nonvirulent buboes free from micro-organisms, but contains elements which absolutely inhibit the growth of these.

A patient presented himself with a large fluctuating bubo the size of a hen's egg, in the left groin, and a single, deep chaneroid on the inner surface of the prepuce. Three inoculations were made from the chaneroid upon the belly. These inoculations produced typical lesions. By means of a syringe the pus was then withdrawn from the bubo and was mingled with the virulent discharge of the chaneroid. Inoculations made with this mixed pus failed to take. In the light of Boeck's research, which has shown that the discharge of a chaneroid can be diluted with several hundred parts of a bland fluid and yet produce characteristic lesion, the results of this experiment are exceedingly interesting.

The evidence leads strongly to the belief that bubo is due not to the direct action of micro-organisms upon the lymphatic glands, but rather to the absorption of certain chemical substances produced by the micro-organism's action in the chaneroid. These products on reaching the lymphatic gland produce inflammation and extensive destruction of tissue without the direct intervention of any micro-organisms, so that if the fluid contents of such buboes be withdrawn under antiseptic precautions it will be found free from micro-organisms, and on inoculation will not produce a chaneroidal lesion. After the bubo has been opened, and especially if antiseptic precautions have not been taken, it is often inoculated with the chaneroidal pus, and the whole exposed surface may become converted into a huge chaneroid. This is, however, rare; perhaps, as has been suggested by Krefting, because the discharge from these buboes contains elements which directly inhibit the growth of the chaneroidal virus.

The evidence is strong, but not conclusive, that in certain exceptional cases not only the irritating products of the micro-organisms, but even these micro-organisms themselves, are carried directly to the lymphatic glands.

Pathologically the lymphadenitis begins as an active inflammatory exudate in the substance of the gland. This exudate is prone to suppurate, and involve the gland capsule, which becomes eroded and finally perforated, allowing the pus to escape into the periglandular tissue, which in the meantime exhibits the symptoms of acute inflammation.

Symptoms.—Bubo usually begins with sensations of pain in the inguinal region, excited by walking or any motion of the leg. On examination, the patient finds one or more tender, hard, movable lumps. The tumors steadily become larger, at the same time the pain on motion becomes so severe that walking is almost impossible. As the tumors increase in size they become less movable, less distinctly outlined, and finally the overlying skin becomes œdematous, reddened, adherent, and on examination distinct fluctuation is perceived. Sometimes the intense pain is rather suddenly relieved, at the same time the tumor becomes somewhat more diffuse. This is due to rupture of the capsule of the gland and escape of its contents into the periglandular tissue. When several lymph glands are involved and suppuration takes place, the individual tumors become merged into one large abscess. When this abscess opens spontaneously, or is incised, there is evacuated a thick, blood-stained purulent fluid, leaving a cavity which presents gray, necrotic walls, and often has projecting into it several of the neighboring glands which have not yet been completely destroyed. If the abscess is allowed to open itself it often produces extensive destruction beneath the skin before spontaneous evacuation, burrowing in all directions, and forming sinuses which are subsequently most difficult to heal. In certain cases, a few days after opening, such an abscess is converted into a large ulcer.

After evacuation of the contents of a suppurating bubo, and especially if drainage is provided for, either by free incision or by careful packing, healthy granulations shortly appear in place of the gray, sloughing surfaces, and the lesion heals without complication. Exceptionally these granulations become exuberant and form fungous masses projecting from the opening.

When the lesion is attacked by chancroidal ulceration, vigorous treatment is usually successful in converting the lesion to a simple ulceration, after which healing takes place promptly. The ulcerating buboes not infrequently, however, reach enormous dimensions before they can be checked. Thus they may expose the vessels and nerves, and even occasion fatal bleeding by ulcerating through the walls of large arteries. Sometimes these huge chancroids, in place of becoming limited and healthy,

take on a chronic form of ulceration, which may last for months or years, slowly extending and involving a large surface.

In cases predisposed to glandular disease, as, for instance, those of the tuberculous temperament, the whole chain of inguinal glands may be involved, forming a nodular tumor which slowly enlarges till it reaches an enormous size, often as large as a child's head. These glands suppurate, usually one after the other. The process is extremely chronic, and, unless treated by the extirpation of the entire diseased mass, may last for months or years, producing fistulæ which yield only to the knife.

In women buboes are comparatively rare. If they occur they are usually found in the inguinal region, and pursue the same clinical course as in men.

Diagnosis.—The chancreoid bubo does not differ from that incident to gonorrhœa, or to infected wound of the leg or foot. In the latter instance, however, the gland lying beneath the saphenous opening is frequently affected, while the chancreoid virus rarely involves this gland. The syphilitic buboes are multiple, usually bilateral, painless, attain only moderate dimensions, and rarely suppurate. When suppuration takes place, however, it is from infection of the specific sore with the micro-organisms of suppuration. In this case the resulting bubo will present the same clinical features as those due to chancreoid.

Strangulated hernia and orchitis, or epididymitis, attacking an undescended testicle, may at the first glance suggest bubo. In the one case, however, characteristic symptoms of hernia will be present; in the other an examination of the scrotum will show absence of the testicle, and suggest the possibility that the symptoms are due to inflammation of this organ or its epididymis.

Prognosis.—The great majority of chancreoid buboes heal kindly. A certain percentage do not suppurate, but even if softening does take place the evacuation of their contents under proper antiseptic precautions is followed by rapid healing. Exceptionally the bubo becomes sloughing or gangrenous. A much more frequent complication in these cases is the formation of fistulæ, usually due to incomplete operation in the first place, or careless after-treatment of the wound.

Phimosis and Paraphimosis.—As a result of inflammatory swelling and œdema incident to chancreoid of the foreskin, phimosis or paraphimosis may develop, or chancreoids may be inoculated beneath a foreskin which is congenitally phimotic.

Phimosis, in case the chancreoid is on the outer surface of the prepuce and easily accessible to treatment, is usually of slight consequence and yields readily to treatment. When, however, it invades the inner surface of the prepuce, the phimosis may absolutely prevent efficient treatment of the lesion, and by causing retention of pus may act as a potent factor

in the development of buboes. The direct local effect of the retained secretions is to excite inflammation, so that a simple chancre is liable to take on intense inflammatory action, to become sloughing, and to destroy not only the prepuce but to involve even the glans and body of the penis. In such cases, before the advent of the sloughing process, auto-inoculation may be of value in clearing the diagnosis. If the patient presents himself with a tight phimosis and a profuse, purulent discharge from the preputial orifice, it may be impossible to determine at once whether this discharge comes from a chancre or from gonorrhœal inflammation of the urethra. By means of inoculations practiced on the body of the patient and by careful microscopic examination of the discharges, the presence or absence of one or both of these lesions can be determined.

In patients with a short prepuce, or those who habitually wear the foreskin retracted, swelling due to chancre frequently occasions paraphimosis. This is a complication much less troublesome than phimosis, since it does not interfere with the direct treatment of the lesion. It may, however, reach such a point as to threaten gangrene by interference with blood supply, in which case prompt surgical intervention will be required.

Phagedena.—Chancres may run an unusually severe course from the very beginning, or after progressing favorably may take on sudden violent inflammatory action. This is due not so much to the virulence of the original infection as to the lessened resistance of the tissues involved. This lessened resistance is often dependent upon a cachectic state. Thus phagedenic chancres are particularly frequent in diabetes, scorbutus, or in the serofulous.

The causes which increase local inflammation, and therefore lessen local tissue resistance, distinctly predispose to phagedena: thus bodily fatigue, uncleanliness, retention of discharge as in case of phimosis, chafing or rubbing of the parts as from sexual congress, may change the chancre of ordinary type into an actively inflamed and finally phagedenic sore.

Phagedena may appear in the form of *limited sloughing*, or may run into *rapid gangrene*, causing in a few hours extensive destruction of parts. Thus in one reported case a patient suffering from chancre was at first not led by the severity of his symptoms to seek professional advice. Noticing, however, sudden development and rapid extension of what he took to be gangrene, he repaired to the hospital, but on being examined after having arrived there, was found to have lost his penis *en route*!

The colored plate (XXIV, Fig. 2) represents the result of phagedena lasting not more than thirty-six hours before it was checked. This patient,

originally of more than normal dimensions as to his penis, has lost, as the result of gangrene, not only all the skin and a portion of the glans, but the greater part of the corpora cavernosa, so that the penis is reduced to one third its normal length and a little over one third its normal thickness.

The sloughing process usually extends in the superficial fascia when, as is usually the case, a lesion is placed on the prepuce about the frænum, or in the coronary sulcus. It may, however, invade all the structures of the penis.

The advent of this complication is characterized by great increase in inflammatory swelling; by dusky coloration of the surrounding skin; by alteration of the discharge, the latter becoming thin, scanty, and blood-stained; and by the appearance of brown sloughs on the surface of the ulcer. In the beginning stage of sloughing the most pronounced symptoms are those of acute inflammation, the surrounding tissues assuming an erysipelatous appearance; and, indeed, the lesion has been termed erysipelatous. If the sloughing process be not very rapid or extensive, the surface of the ulcer is covered by a thick pseudo-membranous mass made up of necrotic tissue, softened by purulent discharge. Such a lesion is termed a *diphtheroid* chancroid. If there is a depraved or cachectic condition of the system, or marked local disturbance in circulation, such as occurs in phimosis or paraphimosis, or from continued irritation of the parts, rapid and extensive destruction of the tissue may set in, when chancroid becomes *gangrenous*.

The gangrenous process may occasion complete destruction of the penis, the scrotum may slough away, so that the testicles are without covering and the femoral vessels may be exposed. As the result of these rapid gangrenous processes, erosion of blood-vessels and violent hæmorrhage are by no means unknown.

In place of this rapid extension the sloughing process sometimes extends much more slowly. In this case the hyperacute inflammatory phenomena are absent, the ulcer progressively enlarges, exhibiting always unhealthy granulations, or greenish or blackish sloughs, and reaches sometimes enormous dimensions. The *chronic phagedenic chancroid* not infrequently extends irregularly in certain directions, healing in one part while the disease is actively extending in another. This gives it an irregular, serpentine course, which is suggestive of the name *serpiginous chancroid*.

Chronic phagedena never occurs in patients otherwise healthy. It is most frequently associated with syphilis, the tubercular diathesis, visceral diseases, and chronic alcoholism.

TREATMENT OF CHANCROID AND ITS COMPLICATIONS.

Treatment of Chancroid.—The *constitutional treatment* of chancroid is usually of minor importance; rest in bed, where this is possible, nourishing and easily digested food, regulation of the bowels, and the administration of a general tonic, such as the potassio-tartrate of iron, three to five grains, thrice daily, or the compound sirup of hypophosphites, one or two teaspoonfuls after meals, are all that will be required in simple cases. Sulphide of calcium, given in one-twelfth-grain doses every two hours, and bichloride of mercury, one forty-eighth grain, three times daily, have been warmly commended as possessing a marked beneficial influence on the course of the chancroid. If such influence is exerted, it is probably due to the general tonic effect of the drugs.

The end to be attained by *local treatment* of chancroid is the conversion of the unhealthy spreading ulcer into a surface of healthy granulations. Since it is universally conceded that the virulent properties of chancroid are dependent upon micro-organisms, antiseptics are theoretically suggested as the most serviceable application, and indeed clinical experience has proved that the employment of such remedies is followed by the best results. The antiseptics employed may be so mild as not to injure surrounding healthy tissue, or may be of such a nature as to cause total destruction not only of the chancroid but of all tissue immediately contiguous to it.

The basis of all formal treatment must rest upon thorough surgical cleanliness, not only of the sore but of the surrounding parts. For the accomplishment of this, weak lotions of carbolic acid or corrosive sublimate are preferable—the former in the strength of 1 to 40, the latter in the strength of 1 to 2,000. The chancroid and the skin about it should be washed repeatedly in one or the other of these lotions, if possible at intervals of two or three hours. All crusts must be removed from the surface of the lesions, and as far as possible the pultaceous necrotic tissue which conceals and protects the area of active extension must be cleaned away. This may be accomplished by peroxide of hydrogen, which should be sprayed into the lesion at intervals of one or two hours, or as frequently as is possible. Chancroids thus treated, even without the employment of any other therapeutic agents, will run a comparatively short course and heal in two to four weeks, especially if the patient is kept at rest. The lesions should be protected from chafing or rubbing of any kind, and should be so dressed that the healthy parts, which might be inoculated, are protected. In addition to this cleansing treatment which should be employed, no matter what other local applications are used, the chancroid may be cauterized, dressed with wet compresses, dry dressed, or subjected to the influence of prolonged hot compresses or baths.

Cauterization of the chaneroid is the safest routine treatment, since thus, if the procedure is properly carried out, the virulent properties of the lesion are immediately destroyed, and complications, such as phagedena and bubo, are avoided. The objection to this method of treating chaneroids is founded upon the fact that the majority of these lesions, particularly in the well-to-do, will under milder treatment remain superficial, not spread widely, occasion little inconvenience, and heal in from two to four weeks. This is so generally true that cauterization need not be insisted on when patients present themselves who are able to carry out all the details of conservative local treatment, and whose lesions are not extensive and are not rapidly spreading.

Cauterization should be practised, as a rule, upon dispensary patients, and upon the ignorant or careless; when the lesion is seen early and is not markedly inflamed; or when it is extending rapidly. In case inflammatory phenomena are unusually well marked, the employment of a cauterant may so add to the local congestion and œdema that sloughing may result. When, however, sloughing has actually begun and shows no tendency toward self-limitation, cauterization should be applied thoroughly.

Chaneroids seen after the first ten days or two weeks may already be in their healing stage, either from having lost their virulent properties as a result of treatment, or simply because the disease has run its course. Under such circumstances cauterization is of course unnecessary. If the sore is seen late and is still unhealthy and extending, its complete destruction is indicated quite as clearly as when it is seen early in its course. The chronic and serpiginous chaneroids yield more promptly to cauterization than to all other treatments combined.

For cauterizing chaneroids, zinc chloride, copper sulphate, the mineral acids, caustic potash, bromine, iodine, nitrate of silver, and the actual cautery have all been advised. By far the best means is the actual cautery, either the glowing iron, the Paquelin apparatus, or the galvanic cautery being employed. If the actual cautery can not be used, strong nitric acid or liquid carbolic acid may be employed. The paste made by mixing together charcoal and commercial sulphuric acid was for many years a favorite application for burning these sores, since not only were the latter robbed of their virulent properties by the acid, but on neutralization and evaporation of the latter there was left a clean, dry dressing, which on dropping out in a few days exposed a surface of healthy granulations. The objections to this paste are that it is not sufficiently penetrating and that it so crusts the lesion that discharges are retained; hence, if canterization has not absolutely destroyed the virus of the lesion, pus may accumulate, the ulcer may increase in size, and the development of chaneroidal buboes may be encouraged.

In applying the actual cautery the iron or wire should be brought to a

white heat, and should then not only be rubbed well into every recess of the sloughing surface, but should be carried a little beyond the apparent limits of the ulcer. Sinuses should be laid open freely, so that the canter may penetrate to their deepest parts, and the cut edges of such sinuses also should be seared. The customary antiseptic washing and spraying should precede and follow such cauterization, and the part should be wrapped in linen kept wet with dilute lead-water and alcohol equal parts, or lead-water and laudanum equal parts, for twenty-four hours. When the operation has been performed thoroughly, the charred crust will come away in three to five days, leaving a surface of healthy granulations. This surface should be washed or sprayed with mild antiseptics twice a day, and should be dressed with dusting powders such as calomel and zinc oxide equal parts, or with ointments such as one made up of salicylic acid twenty grains, albolene one ounce.

The pain of the cauterization is always severe; this may be avoided by spraying the lesion with a ten-per-cent cocaine solution before burning, or still more surely by injections of a two-per-cent cocaine solution under and about the lesion. When nitric acid is employed this is applied by means of a glass rod or a cotton mop. It is rubbed in thoroughly, pain being prevented by cocaine anaesthesia. It causes a dirty yellow slough, not so dry and clean as that resulting from the employment of the actual cautery. This slough should be washed with antiseptics, dried with absorbent cotton, and dusted with iodoform, till it separates, exposing a healthy ulcer.

Nitrate of silver should never be used in the abortive treatment of chancre, though it is an admirable application for stimulating sluggish granulations after the virulent properties of the chancre have been destroyed.

Dry Dressings.—Of the many powders which are employed in the dry treatment of chancre the one most efficient is iodoform; this, in the strict interpretation of the word, is not ranked as an antiseptic, since of itself it has little or no inhibitory power over the growth of the germs. Iodoform only produces its effect when brought in contact with pus, and as the results of chemical changes incident to this contact (probably because of the formation of iodine).

It should be dusted on the lesion after thorough cleansing with peroxide of hydrogen and bichloride of mercury solution, but the precaution must be taken not to apply it so thickly and not to leave it in contact with the lesion so long that in combination with the drying secretions it forms a thick crust, beneath which the disease actively extends. Iodoform is only of service when it is in immediate contact with the diseased area. A crust formed by its admixture with the lesion discharges is no more efficient in checking the progress of the disease than would be the

powder sprinkled on some other part of the body. Hence at each washing the powder remaining from the former dressing must be cleaned away as thoroughly as possible.

The objection to iodoform lies in its unpleasant odor. This, it is stated, can be overcome by mingling with it, in the proportion of one minim to the drachm, oil of cinnamon or oil of roses, or by mixing with it, in the proportion of one to five, finely pulverized coffee-beans. None of these mixtures, however, will entirely conceal the odor.

An excellent and most efficient way of applying the iodoform is in the form of an ethereal solution, one to ten. This sprayed into the clean lesion deposits the drug in the form of a fine powder upon the entire wound surface, since the ether, evaporating almost immediately, leaves the iodoform which has been dissolved in it deposited upon whatever surface it has been sprayed upon.

Iodol and the other substitutes for iodoform have not given entirely satisfactory results. This is possibly because they have a greater tendency to form crusts and thus prevent free drainage.

Salicylic acid and boric acid, either pure or mixed equal parts of each, act as mild continued antiseptics, since they are soluble in the secretions of the wounds and do not produce an undue amount of irritation.

Ointments possess the advantage over powders in that they have not the same tendency to dry, form crusts, and retain the discharges. They possess the disadvantage of acting much more feebly, since mixture of any of the antiseptics with fatty substances neutralizes to a greater or less extent the germicidal effect of the drug. Of the ointments the following will prove serviceable: Sulphate of copper, ten grains; vaseline one ounce; iodoform one drachm, vaseline seven drachms; red oxide of mercury two drachms, lanoline six drachms; nitrate of silver twenty grains, albolene one ounce; acid nitrate of mercury one drachm, vaseline seven drachms.

Ointments can also be made with boric acid, salicylic acid, and calomel as the active ingredients. Salves are particularly indicated where there is a tendency to form crusts, and where the patient's temperament, occupation, or surroundings are such that it is impossible for him to repeatedly cleanse the lesion.

Wet Dressings.—The continued application of mild astringent or antiseptic lotions is warmly commended by many experienced genito-urinary surgeons. Solutions so strong as to be almost cauterant in their action are frequently employed. Thus, Finger warmly commends a lotion of sulphate of copper twenty-five per cent; in this are dipped pledgets of cotton, and these are placed on the chancre and changed every two hours. Cotton pledgets dipped in less irritating solutions, such as camphophenique, or carbolic acid 1 to 60, or bichloride of mercury 1 to 3,000, and

changed so frequently that they are always kept moist with the antiseptic, are less liable to cause undue inflammatory reaction, and at the same time they prevent crusting and retention of discharges. If the stronger solutions are employed, such as liquor ferri chloridi or the sulphate of copper lotion, these are exchanged for milder applications as soon as the chancreoid becomes converted into a healthy sore.

This wet dressing is serviceable when the patient can not or will not take the time and pains necessary for the frequent daily cleansing of the lesion which a free discharge requires, and when more vigorous antiseptic action is required than is afforded by ointments.

Under wet dressings may be considered the treatment of chancreoids by means of *hot baths*. This has always been a favorite therapeutic measure in intractable cases, and is founded upon the fact that the chancreoidal ulcer loses its specific properties at a comparatively low temperature. These baths may be local or general. The local bath may be given by soaking twice daily the diseased part—the penis, for instance—in water as hot as can be borne, and maintained at this temperature for one or two hours; or by giving the patient a sitz-bath continued for many hours. This local treatment is serviceable in phagedenic ulceration, converting in a few days a sloughing ulcer into a surface of healthy granulations which heals rapidly and kindly.

The general bath, particularly applicable to cases of phagedena and serpiginous ulceration, may be continued night and day for weeks, or even months; or the patient may remain in the bath only during the day.

Operations.—Two operative procedures have been suggested and indeed are warmly commended as efficient in securing the immediate cure of chancreoid. One requires a thorough curetting of the ulcer, and subsequent washing of the seat of operation with 1-to-40 carbolic solution, or 1-to-2,000 sublimate, followed by the application of an iodoform dressing. The other consists in excision of the whole involved area and suture of the resulting wound, and an attempt to obtain union by first intention.

Petersen states that of one hundred and sixty-two cases treated by curetting, the average time for complete healing was about eight days, and that in not a single instance did buboes develop under this treatment.

The excision method is one not to be commended, since, in spite of most careful antiseptic precautions, the whole wound frequently becomes converted into a chancreoid much worse than the one for which operation was undertaken.

Of the various means of treatment already noted, each has its warm advocates, and each if faithfully carried out will give satisfactory results. The methods which have been used with most success in the patients under my charge are the following: The chancreoids and the regions surrounding them are thoroughly cleansed by means of sprays, these seeming

not only to penetrate the sloughing surface of the lesions, but also to disinfect the surrounding skin more efficiently than lotions. The sprays used are first peroxide of hydrogen, a hard-rubber nozzle, of course, being required for this chemical; next comes carbolic-acid solution 1 to 40; each spray is used for one minute. After this cleansing, if the chancre is uncomplicated, and if it has not attained large dimensions—that is, if it is no larger than the thumb or finger nail—and if a moderate increase of the inflammatory symptoms is not liable to cause phimosis or paraphimosis, a spray of a ten-per-cent cocaine solution is applied to the lesion, and the whole affected area, and a little beyond this into the healthy tissue, is destroyed by the application of commercial nitric acid. The seat of cauterization is then dusted with iodoform, a piece of absorbent cotton dipped in 1-to-40 carbolic solution is applied over this, and the dressing is held in place according to the position of the chancre, either by drawing the foreskin forward, by a film of collodion, by a bandage, by a condom, or by means of swimming-tights and cotton packing. In case marked inflammatory swelling follows this application, the parts are wrapped in lint kept wet with a solution of lead-water and dilute alcohol, equal parts of each. Night and morning the seat of operation and the surrounding area are carefully sprayed with the peroxide, and the carbolic lotion and the dressing first described are applied; thus reinfection of the granulating surface is prevented. When iodoform is rejected on account of its odor or because of idiosyncrasy to its action, aristol, iodol, calomel, or zinc oxide can be used. When the slough comes away and a healthy granular surface is exposed with scanty secretion, iodoform and carbolic acid should be omitted in the dressing, the lesion should be touched with a four-per-cent solution of nitrate of silver once a day, and should be dressed with a bland dusting powder, such as zinc oxide, or with a mild antiseptic ointment.

When a patient presents himself with a chancre which is attended with marked inflammatory swelling of the surrounding tissues, such irritative treatment is to be avoided, since, in the first place, a cauterant will often not penetrate to a sufficient depth to totally destroy the virus, and finally an added irritant may cause such a rapid increase in congestion and exudation as to favor the conversion of the lesion into a phagedenic sore. Under these circumstances attempts at abortive treatment are no longer advisable. The same cleansing spray should be employed as before, followed by iodoform. For the application of this a spray of iodoform-ether (ten per cent) will be found most efficient; the application of a cotton compress soaked in carbolic acid completes the dressing. The inflamed part is then wrapped in lint, which must be kept wet with the lead-water and alcohol lotion, and the patient is directed to remain in bed. Where discharge is free and inflammatory symptoms are pronounced, this dressing must be renewed every one or two hours.

If the chancre is still further complicated by sloughing, which, though well marked, does not seem to be rapidly progressing, or even if phagedena is active and progressive, the treatment already mentioned should be supplemented by continuous hot baths in antiseptic solutions. If the lesion is placed upon the penis or scrotum alone, these parts can be bathed in a hot solution for one or two hours at a time, the treatment being repeated three or four times a day. Where the chancre is multiple they may be treated by means of a prolonged sitz-bath, or even by means of a general bath continued through the entire day.

When chancre is complicated by phimosis so tight that it is impossible to make applications directly to the surface of the ulcer, the preputial sac should be washed out every two hours with carbolic lotion 1 to 60, or bichloride solution 1 to 4,000. It should then be syringed with a ten-per-cent iodoform-glycerin mixture, and inflammatory swelling should be allayed by keeping the penis wrapped in lint kept wet with lead-water and alcohol.

If, in spite of this treatment, inflammatory symptoms increase, the swelling becomes more marked, and particularly if the surface of the foreskin assumes a bluish tint, the latter should be at once slit up along its dorsum, so that the chancre can be thoroughly exposed. The original lesion is treated in accordance with the methods already described. Usually the line of incision will also take on chancreal inflammation. This may sometimes be prevented by the liberal use of peroxide and carbolic-acid sprays, and particularly by prolonged hot soakings of the affected part in mild antiseptic solution, such as 1 to 10,000 bichloride.

The objection to circumcision, under these circumstances, depends upon the fact that the wound is very frequently inoculated with the chancreal virus, and will become shortly converted into a circular chancre. I have five times performed circumcision in cases of inflammatory phimosis due to sub-preputial chancre, and, in spite of the most elaborate precautions, have in each instance had the entire operation wound converted into a circular chancre.

The serpiginous chancre rarely yields in the slightest degree to ordinary local treatment. Before cure can be expected, the underlying constitutional dyscrasia must be corrected. When these lesions are encountered, the existence of syphilis should always be inquired into most carefully, since many serpiginous ulcers are in reality manifestations of tertiary syphilis, occurring coincidentally with chancre. When there is a specific history, constitutional treatment should always be tried. Malaria, struma, diabetes, must each receive its appropriate treatment. Tonics, stimulants, and nourishing foods are always indicated. The potassium-tartrate of iron is said to be particularly serviceable. Opium has also been warmly advocated, and should be given in grain doses once or twice

a day. It is in this class of lesions that prolonged general warm baths have been most successful. The patients should have the entire body immersed in these baths night and day for weeks at a time. One such case I had under my care. He had resisted all treatment (including the actual cautery applied three times) for three years. The sore extended almost to the umbilicus, exposed the sheaths of the femoral vessels, and laid bare the entire groin. After three weeks of continuous warm bathing almost complete cicatrization was accomplished. The healing process continued after the patient was removed from the bath, and two months after the beginning of the treatment he was discharged cured.

The most potent local means of replacing the unhealthy ulcerating surfaces by vigorous granulations is found in the actual cautery. This must be applied thoroughly to the entire affected region. The after-treatment consists in the application of mild stimulants, such as a four-per-cent solution of nitrate of silver or sulphate of copper, dusting with iodoform or bismuth, and carefully protecting the granulations from external injury.

The Treatment of Chancroidal Buboës.—Buboës may be treated (1) by external applications, having for their object the prevention of suppuration or the absorption of pus when it is formed in small quantities; or, when the bubo is far advanced, the hastening of the suppurative process; (2) by medicaments carried directly to the focus of inflammation; (3) by surgical procedures, including (*a*) extirpation of the inflamed glands before suppuration is well advanced; (*b*) evacuation of the contents of suppurating buboës; (*c*) evacuation and curetting.

If the bubo is seen before pus formation has taken place—i. e., in the first three days of its development—the abortive treatment may be tried. This has for its object the prevention of suppuration. This end is sometimes attained by rest in bed, the application of heat, and pressure by means of hot shot-bags placed on the bubo, and by moderately free purgation. Internal remedies, such as sulphide of calcium, one-twelfth grain every two hours, or bichloride of mercury, one-forty-eighth grain three times a day, may also be administered.

The use of counter-irritants and resolvents, such as iodine painted around but not directly over the inflamed gland, or the application of an ointment made up of mercurial ointment one part, belladonna ointment one part, compound iodine ointment one part, together with pressure applied by means of a spica of the groin, is perhaps the most popular method of aborting buboës.

Probably the most important part of the abortive treatment is rest in bed, and by this means alone a certain percentage of chancroidal buboës can in their very earliest stage be prevented from going on to abscess formation.

Auspitz long since asserted that tincture of iodine never yielded satisfactory results in his hands, and an extended experience in the hospital service leads me to the conclusion that external applications of this drug are without value.

Spitschka prefers, above all other applications, a solution of subacetate of lead. The lotion is made up as follows: \mathcal{R} Powdered alum, five parts; solution of subacetate of lead, five parts; distilled water, five hundred parts. Compresses wet in this solution are applied to the swollen glands, and are kept in place by a pressure bandage. This dressing is changed two to five times a day. As a result, pain rapidly subsides, and often suppuration is prevented. Occasionally dermatitis results from this application. In addition to this treatment he warmly commends inunctions of mercurial ointment; one drachm of this is rubbed in about the inflamed region every day. Painting with tincture of iodine, ice poultices, and all other treatment he considers utterly useless.

Injection.—The injections of antiseptic materials, such as bichloride of mercury and carbolic-acid solution, are highly commended as means of aborting buboes. The first solution occasioned violent pain in Spitschka's hands; the second was not followed by satisfactory results. Puncture and aspiration were likewise abandoned as unsatisfactory. All these treatments after a time gave place to removal of the diseased glands and the neighboring affected tissues.

Welander reports extraordinary results in the treatment of non-suppurating buboes from the injection of benzoate of mercury. These results are in the main confirmed by Spitschka. The method consists in the injection of fifteen to thirty drops of a one-per-cent solution of benzoate of mercury. The needle is entered at two or more points. The immediate result is an increase in the pain and local inflammatory phenomena, and some general fever. After one or two days the inflammation subsides, and prompt resolution takes place in the great majority of buboes which are not fluctuating.

One treatment was sometimes insufficient; in this case the injections were repeated. When fluctuation became more marked after injection, and on repetition of the treatment there was no tendency toward resolution, the contents of the abscess were aspirated through the aspirating needle, fifteen to thirty drops of the benzoate of mercury solution were injected, and a compress wet in a two-per-cent solution of acetate of aluminium and held in place by pressure bandage was applied. Aspiration was not very successful, since the wound made by the needle had enlarged in twenty-four hours, and there was a discharge through this opening. Better results followed a puncture made by the bistoury, this puncture being kept open by a small strip of iodoform gauze. In a few days discharge ceased, surrounding inflammatory involvement disappeared,

and prompt healing took place. Only exceptionally did the wound present the characteristics of chancreoid ulceration. In the few cases noted this was always due to the fact that there was a diseased superficial gland through which the needle had been completely driven, the injection thus being carried beyond it. Where in spite of this treatment abscesses formed, they were thoroughly washed out with 1-to-1,000 sublimate and received a careful antiseptic dressing; this dressing was reapplied every two or three days.

Of sixty-two patients treated in this way, twenty-three were cured by injection alone; in thirteen, puncture and antiseptic dressings were required; in twenty-six suppurating cases, incision was necessary.

Of the cases cured by injection, a number showed distinct fluctuation. Even when injections were not successful in preventing further suppuration, they so acted that all the involved glands became completely liquefied, thus rendering unnecessary the dissection often required when these glands are only partially destroyed—a procedure which is at times both tedious and dangerous. Another advantage claimed by Spitschka is, that the injection treatment allows a number of lymphatic glands to remain untouched, which in operation would be removed, and that thus extensive scarring is avoided in the inguinal region.

In whatever way suppurating inguinal buboes are treated, it must be borne in mind that in the great majority of cases, possibly in all cases, the contents of these buboes are absolutely free from germs; that after minute attention is paid to antiseptic precautions the healing will be kind; and that the important point to observe in operation is to avoid infection, either with the virus or the chancreoid if such exists, or with the ordinary pyogenic organisms. This point is worthy of some attention, since it is often held that the bubo is already infected with septic germs, and that antiseptic precautions are perfectly futile.

Operation.—The operative treatment of bubo consists in free incision, and excision of glands not yet entirely broken down, or when the suppurative process is further advanced in evacuation of the purulent and necrotic tissue and thorough curetting of the walls of the abscess. When the skin still preserves its vitality, none of this need be sacrificed. The opening must be long enough to allow for drainage, and when sinuses are formed—a complication particularly liable to occur when abortion of the bubo has been attempted unsuccessfully—they must be laid open freely. This sometimes necessitates very extensive wounds, but there should be no hesitation in carrying the incision as far as required. When the skin immediately overlying the chancreoid is thin, blue, ulcerated either at one spot or in a number of places, this should be sacrificed, an oval-shaped piece being removed. After evacuation of the bubo the wound must be explored for glands which are involved in the suppurative process, but

are not yet thoroughly broken down. These can usually be shelled out by the finger; but sometimes, when periadenitis is fairly well marked, they are tightly adherent and require dissection. This dissection must be carried out with great care where glands lying over the saphenous opening are involved, since a wound of the femoral vein may readily be inflicted by a careless operator. I have known this accident to occur twice, once with a fatal termination.

After removal of all markedly enlarged glands and thoroughly eurenting the entire abscess cavity, the latter is painted with a chloride-of-zinc solution, sixty grains to the ounce of water, and is packed with sterile iodoform gauze. An antiseptic dressing is applied, and is kept in place by a spica of the groin. This dressing is renewed every two or three days, the packing being so placed that the wound is forced to heal from the bottom. If proper care has been taken there will be little or no suppuration from the most extensive wound, healthy granulations will form, and in from two to eight weeks, depending upon the size and depth of the wound, cicatrization will be completed. When the granulations become indolent they should be brushed with a four-per-cent solution of nitrate of silver at each dressing.

Pontan treats suppurating buboes by first thoroughly cleansing the neighboring parts with bichloride solution, puncturing the center of the tumor, allowing the pus to escape, finally injecting a ten-per-cent mixture of iodoform and fluid vaseline. An antiseptic dressing is applied over this. He claims cure in six or eight days.

Harvey treats non-suppurating buboes by first anæsthetizing the skin, after which twenty drops of a fifteen-per-cent solution of carbolic acid are injected into the center of each enlarged gland. One injection, he states, is often sufficient, and the patient is not obliged to take to his bed.

Teaelke, as soon as fluctuation is detected, makes an incision about one third of an inch long through which all the pus is allowed to escape. The cavity is then distended with tincture of iodine, this liquid being driven in by means of an ordinary gonorrhœa syringe. The fluid thus injected is pressed out, a thin antiseptic dressing is placed over the bubo, and this is covered with a large sponge, the latter being wide enough to overlap the entire inflamed area. In twenty-four hours this dressing is renewed, all fluid remaining within the sac being carefully pressed out. The patient is confined to bed for four or five days. Teaelke states that anæsthesia is not required for this procedure; that though pain is severe for a time, it is transitory, and claims for his method rapid cures.

Wertheim advises puncture of the suppurating bubo by means of a thick aspirating needle. Most of the pus is drawn off, and eight to ten drops of a four-per-cent solution of the muriate of ammonium are inject-

ed. As the fluid in the cavity accumulates it is again tapped. The injections are repeated daily at first, afterward at longer intervals.

Zeissl first carefully depilates the skin covering a bubo, puts the patient to bed, and applies compresses wet in a solution of subacetate of lead. These compresses are not allowed to dry. As soon as pus is formed it is evacuated by means of a small puncture. When in spite of drawing off the pus there are marked symptoms of inflammation, the skin must be freely laid open, and the abscess cavity curetted and packed.

In the treatment of bubo the best results in the long run would be obtained by immediate excision of the glands as soon as they become markedly inflamed, and closure of the resulting wound by suture. The majority of patients will not submit to this, since the surgeon is bound to inform them that in a certain percentage of these cases suppuration may be avoided by less radical measures. It is, however, a good rule to attempt abortion of the bubo not longer than three days. If no good results follow in this time, suppuration will almost certainly occur. Then excision should be advised, and, if this is not permitted, benzoate-of-mercury injections should be employed.

When after opening the bubo the wound becomes chaneroidal in type, the treatment should be conducted according to the principles laid down in discussing chaneroid. The radical treatment is thorough cauterization, the hot iron being employed. Thorough cleansing, iodoform applications, and in obstinate cases continued warm baths, will also yield good results in these cases.

CONDYLOMATA ACUMINATA.

Condylomata acuminata, or the so-called "venereal warts," differ from the condylomata found on other surfaces of the body mainly in the circumstance that they are encountered on or about the genitalia and grow from mucous surfaces.

They appear as small or large, discrete or confluent, moist or dry papillary overgrowths, springing particularly from the coronary sulcus, the inner surface and margin of the prepuce, the region of the frænum, the orifice of the urethra, and in women from the greater and lesser labia, the urethra, and the margins of the anus.

These warts occur quite independently of any venereal affection, though they are frequently associated with such affections, being due to the irritation incident to a purulent discharge. Thus the balano-posthitis, occasioned by gonorrhœa, or the irritation consequent on the discharges of a chaneroid, a chancre, or a secondary specific lesion, are often quite sufficient to occasion papillary outgrowth. Such outgrowths are, however, as readily excited by simple balano-posthitis such as occurs in phimotic youths,

or by other nonspecific inflammations or discharges. Not infrequently warts arise without any apparent cause.

Pathology.—As a result of irritation and maceration of the epithelium, or without apparent cause, the papillæ and the rete mucosum hypertrophy; the papillæ not only elongate, but also give out lateral branches, growing much as does a tree. Corresponding with this outgrowth there is a commensurate development of blood-vessels. The papilloma may grow not only in length but also in breadth, in the latter case appearing as a flat outgrowth.

It may be horny, but when it grows from the genital surfaces is usually soft and red. When condylomata are so placed that they are kept moist and abraded by the contact of skin or mucous membrane surfaces, a purulent, extremely offensive discharge usually occurs.

Etiology.—Though venereal warts are occasioned by irritating discharges such as those incident to neglect of ablutions, gonorrhœa, recurrent herpes, or local lesions of any kind, it is interesting to note that heat and moisture generally seem to be factors necessary to their development, since they are rare on the penis of the circumcised and of those with short foreskins; and in women they occur on skin surfaces, which are normally in contact, as between the buttocks and on the surface of the greater and lesser lips.

It has long been held that the secretion from venereal warts will, if inoculated upon healthy surfaces, produce a like lesion—in other words, that these outcroppings are due to a specific cause. This belief has recently obtained new life on the basis of investigations as to the causative relation of protozoa to disease; but thus far all that has been advanced upon the subject is purely speculative. It is true that cases are reported in which warts were acquired by men who had sexual congress with women suffering from similar lesions. It is probable that in these cases the irritating discharge sufficient to excite the first growth of lesions in the woman still persisted and was operative in the case of the man.

It is evident that there must exist a certain predisposition to the development of these outgrowths, since of many men who expose themselves to the same source of contagion an exceedingly small number develop papillomata. Some countenance is given to the theory of contagion by reported instances of several men acquiring warts from the same woman, and by the well-known clinical fact that when one wart develops on the sexual organ others are liable to follow.

Symptoms.—Condylomata usually appear in persons between fifteen and twenty-five years of age as highly vascular outgrowths, which may project from the skin surface as one or more threads, or appear as discrete, small-sized tuberous excrescences, or form by confluence large outgrowths resembling in appearance a raspberry, a cock's comb, or a red

cauliflower. The confluent papillomata usually assumes the form into which they are molded by pressure of the surrounding parts.

When their surfaces are macerated, venereal warts bleed readily and are liable to become inflamed, involving the surrounding tissues in ulceration, which sometimes produces a cure by sloughing of the lesion. When placed within the urethra they occasion a moderate muco-purulent discharge, and, if accompanied by erosions of the surrounding parts, slight *ardor urinæ*. The urethral condylomata are usually placed at or very near the meatus, where they are readily recognized and removed. When they grow from within the margin of the anus, the mechanical irritation of the fæces often occasions ulceration with its attendant symptoms.

The main inconvenience occasioned by warts depends upon the interference with function incident to their excessive growth. Thus I have seen the glans penis almost entirely concealed by a luxuriant cauliflower excrescence of such a size as to prevent coitus. Similarly there may occur an enormous outgrowth about the labia and the anus of women; indeed, it is in this sex and in these regions that the excessive growths are most prone to occur.

Diagnosis.—Venereal warts can scarcely be confounded with any other lesion, excepting perhaps the mucous patch or condyloma latum and epithelioma.

The condyloma latum or mucous patch is distinguished by the fact that there is a history of syphilis and other signs of the disease, though it must not be forgotten that this lesion of secondary syphilis may excite pathologically a true papillary overgrowth almost identical in appearance with the overgrowth of condyloma acuminatum.

Epithelioma is rare in youth and early maturity; it ulcerates, grows rapidly, does not merely spring from the skin surface, but involves the surrounding tissues in a dense infiltrate, and is accompanied by a characteristic induration of the inguinal glands.

At the time the differential diagnosis is most important—i. e., at the beginning of the malignant growth—it is most difficult. Perhaps the most reliable point in this period of the disease will be the depth to which the malignant neoplasm involves the tissues from which it springs. Only by means of microscopic examination of sections from the outgrowth can a positive opinion be given, since clinical experience shows that the benign neoplasm is at times transformed into a malignant growth.

Prognosis.—Venereal warts, if kept clean, and protected from mechanical irritation, tend toward spontaneous recovery, though predictions as to when this result will occur can never be made with safety. If utterly neglected they are prone to become the center of ulcerating and suppurating areas, which may often be complicated by inflammatory buboes and exceptionally form the starting point of cancer. A wart found upon

the sexual organs of an old person, even if characteristic in appearance, should always excite suspicion, since this benign neoplasm is comparatively rare after middle life, while malignant growths are by no means uncommon, and in their beginning period closely resemble the venereal wart.

Treatment.—With removal of the exciting cause venereal warts frequently disappear without direct treatment. Whatever condition a lesion presents, local irritation or discharge should first receive attention. Thus phimotic patients should be circumcised, urethral discharges should be prevented from coming in contact with the external parts, leucorrhœa should be cured, and when the warts occur about the anus, ulcers or fissures of this region should receive attention, as discharge from the vagina should be prevented from flowing over the region.

Complete removal of the papilloma and cauterization of the base from which it springs is the only reliable direct treatment. Ligature has been very justly discarded, Letzel mentioning the fact that he has personally seen tetanus follow in three cases thus treated. The objection urged against excision is, that these growths are extremely vascular, and that when they attain large dimensions free bleeding follows their removal. This bleeding is, however, easily controlled; indeed, it usually stops spontaneously, or, if it does not do this, moderate pressure or the application of the actual cautery will always prove effectual.

The method of operating on condylomata is as follows: Where the outgrowths are discrete and small, each is seized by a pair of rat-tooth forceps, drawn upward and removed, together with the tissues of its base, by a snip of the scissors. The little bleeding points left by this cutting are touched with pure carbolic acid and dusted with iodoform, and the dressing is complete. When the neoplasm has a large base, the whole outgrowth may be shaved off level with the surrounding surface by means of a sharp, flat knife. The wound left by this incision should be thoroughly curetted, and then should be cauterized with carbolic or nitric acid and dressed with iodoform or with calomel, or with a powder made up of calomel and zinc, equal parts of each.

A still more radical method of procedure, and one always applicable when the papilloma springs from the prepuce or skin surface, consists in dissecting out the entire base of the papilloma, and approximating the resulting wound by sutures. This operation, if properly performed, gives absolute assurance against recurrence of the lesion *in loco*.

In case the knife is objected to, cauterization of the papillomata may be practised by means of the hot iron or galvano-cautery, or strong acids or alkalis may be employed to destroy the neoplasm. Nitric acid is perhaps the favorite cauterant. When it is employed, the surrounding surfaces should be protected by the application of a little cosmoline, the acid should be well rubbed into the diseased part, and the dressing should

consist of a piece of cotton or lint well covered with boric-acid ointment. The application is repeated every second or third day until the papillary layer of the skin is destroyed at the point of outgrowth.

When cauterant applications are imperfectly made they act as a powerful stimulant, causing the warts quickly to attain large dimensions.

Chronic acid is an excellent application, but is open to the objection that exceptionally it occasions general toxic symptoms. It is usually employed either pure or in a ten-per-cent solution, which is liberally brushed over the outgrowths once daily.

Caustic potash is one of the most efficient of the cauterant agents. An excellent method of using it is by means of the following prescription: Oxide of lead, two grains; thirty-three-per-cent solution of caustic potash, one drachm. This should be well shaken, and by means of a brush thoroughly applied to the lesions, which have previously been carefully cleansed and dried. One or two applications are sufficient.

There are conservative methods of treatment, many of them depending for their reputation upon the well-known fact that with the removal of the exciting cause these growths have a tendency toward spontaneous disappearance. All are uncertain, and should not give place to more radical methods when the latter are applicable. A favorite prescription is the following: \mathcal{R} Salicylic acid, one drachm; acetic acid, one fluid-ounce. \mathcal{S} . Apply with a brush, once daily. A saturated solution of salicylic acid may be employed. This should be applied repeatedly. Other astringents, such as the liquor plumbi subacetatis and tincture of perchloride of iron, are frequently advised. After these applications have caused the papilloma to disappear, cauterization of the base usually will be necessary to prevent recurrence.

Venereal warts affecting the genitalia of women often grow rapidly during pregnancy, attaining extraordinary size. After delivery they become in part or wholly absorbed. This should be remembered in considering the advisability of operation under these circumstances.

CHANCROID OF THE ANUS AND RECTUM.

By JAMES P. TUTTLE, M.D.

THE clinical appearances and course of chancroid are modified in a marked degree by the accident of location. The variations observed in the characteristics of chancroids of the rectum and anus may be accounted for by the anatomical and physiological relations of the parts, and the customary hygienic care devoted to them by the classes in which these affections are generally found. Be it said to the credit of the American nation, that primary venereal disease of the rectum and anus, or any other affection of these parts, due to sodomy or pæderasty, are extremely rare, and, though I have seen them in my clinical experience, it has rarely been in a native-born citizen.

The following table exhibits the comparative frequency of the disease at this point in the two sexes, as observed by different writers:

Fournier, in males.....1 in 445.

Fournier, in females.....1 in 9.

Perondi, in both sexes.....2 in 83, both in women.

Debarge, in both sexes.....5 in 216.

Sturgis, in both sexes.....8 in 83, all in females.

While the other authors have not so divided their observations that a proportionate frequency can be made out, one may easily infer from them that those of Fournier are not far from correct. The close proximity of the anus to the genital organs in the female, the facility with which all discharges from the vagina may come into contact with it, the liability of the male organ to touch it in coition, and the comparatively greater frequency of the practice of sodomy over that of pæderasty, account for the proportionately large number of these ulcers about the anus and rectum in women. In the large majority of cases they are not primary, but secondary to chancroids elsewhere, and therefore due to auto-inoculation.

About the anus and rectum these sores differ in character and appearance according to their location—whether they occur in the perianal, anal, or rectal tissues. In order to understand this, it is but necessary to refer to the constituent elements of these parts. The perianal region, composed of the perinæum, intergluteal and coccygeal surfaces, is covered with a horny, epithelial layer and a cutaneous tissue of considerable

thickness. This region is richly endowed with sweat-glands, and sebaceous and hair follicles. It is constantly irritated by the friction of clothing, and of the surfaces against each other, and, bathed in the irritating secretions of the parts, the epithelial layer is constantly more or less macerated and abraded. It is easy to see, then, how virus may find a lodging-place in one of these follicles, and produce a pustular sore, or how it may be inoculated through the abrasion of surface, and how, having once been ingrafted here, it would spread as an erosion from one point to another. At the anus, besides there being a thin, mucocutaneous tissue, full of veins and easily torn, the columns of Morgagni, or folds of mucous membrane, form sulci at their bases, which are frequently torn by hard fecal movements, and which are veritable nests for virus of any sort. Confined as the venereal virus may be in these parts, the ulcer which it produces takes on the conformation of the parts—follows the folds up and down and outward into the submucous and muscular tissues.

The rectum, though paved with columnar epithelium—a fact which has been held by some to render it insusceptible to venereal virus in general—is lined by millions of little follicles of Lieberkuhn, and has many sacculi or folds in its mucous membrane which furnish a resting-place for specific germs which may gain entrance into the organ. These surfaces are frequently abraded or torn by hardened fecal balls, which renders them liable to venereal infection. These sacculi or pockets, as a rule, run circularly around the rectum, and it is in this direction that the early venereal lesions usually extend. These facts explain to some extent the variation in chancroids of these parts from those found elsewhere.

Perianal Chancroids.—These have been appropriately termed by Mollière, *chancrelles interfessières*, owing to their appearing upon the perineal or coccygeal regions, especially the latter, where the folds of the buttocks lie in close contact. They possess the characteristics of erosions more than of ulcerations; they are shallow, show little tendency to spread, and do not secrete abundant pus. They are usually associated with similar sores elsewhere—so frequently, indeed, that one writer has termed them “satellites of other chancroids.” Other authors doubt their chancroidal nature, and claim that they are only inflammatory phenomena; but the fact remains that these ulcers are auto-inoculable, and if Van Buren’s statement that chancroids are the only ulcers possessing this characteristic is true, this fact ought to put the question at rest. These ulcers rarely become phagedenic, but if they extend at all it is generally in the direction of the folds of the buttocks, and not toward the anus. They are not painful, and frequently occur and pass away in the course of chancroids elsewhere, being mistaken by the patient for simple chafing. They tend to heal spontaneously, and are less liable to become chronic than any form of chancroid.

Anal Chancroids.—The mucous folds of the anus are largely confined to its anterior and posterior borders, and it is between these folds that a large majority of fissures occur. No better hiding-place could be conceived for the chancroidal germs than in these little crypts, and none which they could reach with greater facility in women. Chancroids occur here as little, grayish-yellow fissures between the folds, and might be overlooked except for the pain they give. They may be easily mistaken for simple fissures, unless careful attention be paid to their color, free secretion of pus, association with chancroids elsewhere, and auto-inoculability. They involve the cutaneous and subcutaneous tissues freely, but advance with difficulty and slowly upon the rectal mucous membrane. When they do extend into the rectum it is along one of the little sulci between the columns of Morgagni, until they reach the upper border of the internal sphincter. Over the level of this muscle they remain stationary, but spread circularly above and below, and thus take on an hour-glass shape.

They both advance and heal very slowly, their tendency to chronicity being one of their chief characteristics. From one sulcus they sometimes infect another and another, till the whole anal circumference is involved, and it presents a condition similar to that described as the preputial chancroidal crown. Their base is gray and sluggish, the pus is fetid, sometimes sanious, and occasionally little fistulas pass through the folds from one sulcus to another. In course of time their virulence may die out, leaving a simple chronic ulcer, which is not inoculable. Mollière says this is liable to occur if they be complicated with hæmorrhoids, and that the ulcer left is a simple varicose ulcer (*Maladies du Rectum et de l'Anus*, p. 679).

The extreme pain following defecation renders constipation the rule in these patients. We are speaking now of anal chancroids, and the patients suffer all the consequent symptoms of irregular bowels, anal irritation, loss of sleep, and shock from excessive pain when the movement has become necessary. The pain is severest after stool, sometimes amounting to almost agony for hours. Unlike the former class, they do not tend to heal spontaneously, but under judicious care most of them get well without any unfortunate sequences. The bowels should be kept open and the parts thoroughly clean. A gentle but thorough touching of the ulcer with equal parts of carbolic acid and tincture of iodine, followed by frequent washings with lime water or black wash, and the application of a powder composed of equal parts of calomel and oxide of zinc, usually suffices to heal them in a week or two. The speculum should be introduced in order to treat the whole ulcer. When the pain is intense, and due to spasm of the sphincter, one must have recourse to the knife or forcible stretching of the sphincter, as in simple fissure; but this should

not be done hastily, for Ricord and Fournier have each had serious results follow this practice in chaneroids of the anus.

Other cauterizing agents and other powders may take the place of those above mentioned, but none have acted better in my hands, and they are free from stain and odor. Occasionally iodoform seems to have a specific influence upon these ulcers, but it is rarely necessary to make use of such a disagreeable agent.

Rectal Chancroids.—Chancroids of the rectum are very rare. They are due to unnatural intercourse, and their true history is scarcely attainable. The fact that mucous membrane covered with columnar epithelium seems to be refractory to gonorrhœal, chancroidal, or syphilitic virus, justifies the doubt of their existence. They do exist, however, and may be diagnosed by their character and auto-inoculation. "Ulceration of the rectum," says Kelsey, "begins in the rectum proper, well above the sphincter, and not at the skin of the anus, except in some rare cases of lupus, tubercular disease, and rodent ulcers" (Diseases of the Rectum and Anus, p. 326). It is almost impossible for these sores to be the sequence of sores elsewhere in the body, even at the anus, for the sphincter, constantly closing tight this aperture, acts as a barrier to advancing germs, and the daily fecal movements sweep out before them those that may have nearly gained the orifice. Those that have been seen have generally been associated with others upon or about the anus, and with an erythema of the groove between the buttocks; but it is much more logical to conclude that these are the result of inoculation from the upper chancroid than *vice versa*, for in that case the lower part would necessarily be bathed with the purulent discharge from above. These chancroids are situated above the sphincter, are of an irregular shape, grayish in color, with pale, feeble granulations, and they discharge an abundant, sanious, and irritating pus. Their symptoms are obscure, "diarrhœa and discharge from the rectum" being about all the patient is willing to confess that he knows about the case. The ulcers are generally shallow, with clean-cut borders, and comparatively stationary. Occasionally they show a tendency to deep ulceration, invading the submucous and muscular coats of the bowel and destroying the sphincter. Under such circumstances they may become the starting point of fistulas, which may or may not open upon the skin. This fact should be borne in mind, for in treating them a burrowing fistulous tract may be overlooked which will render all our efforts vain.

Their management consists in regulation of the bowels, irrigation of the rectum with an antiseptic solution, such as a fifty-per-cent saturated solution of boric acid, and the application of astringents or mildly cauterizing agents to the ulcer itself. If the ulceration is large, the patient should be confined to bed and kept upon a strictly milk or fluid diet.

Phagedenic Chancroid.—This is, in my opinion, the most malignant and distressing of all venereal diseases. It is due to a peculiar constitutional condition which renders the tissues rich and palatable morsels for the chaneroidal virus to feed upon. This is proved by the fact that if a healthy person is inoculated from a phagedenic chaneroid he develops only a simple soft sore; on the other hand, if a patient suffering from phagedenic chaneroid be inoculated from a simple chaneroid, the point of inoculation will take on phagedenic symptoms (Diday and Doyon, *Thér. des Malad. Vénér. et de Malad. Cutan.*, 1876, p. 184). It may be acute or chronic.

In the *acute form* it resembles an intense cellulitis or erysipelatous inflammation. Its march is rapid and devastating in all directions. The deep tissues as well as the superficial are involved in the destructive processes; the parts become swollen, angry, tender, and œdematous, the temperature is elevated, the pulse rapid and feeble, the tongue dry and pasty, vast suppurating cavities form in the parts, and the lymphatics soon become inflamed and suppurate. The pus from these buboes is non-inoculable, and they have been called by Rollet sympathetic buboes. The symptoms of this condition are in no way connected with the virus of chaneroid, and one is justified in holding that such cases are nothing more than pyæmia, due to the absorption of simple pus from the chaneroidal ulceration. Metastatic abscesses may develop in other portions of the body, the patient's strength fails rapidly, and unless radical measures are adopted and successful the disease is very likely to prove fatal; otherwise the patient recovers through a prolonged convalescence, with large cicatrices covering the region of the sloughs.

The *chronic form* is less alarming and less dangerous to life, but equally as trying to the physician. It is the one form of ulceration that shows a tendency to extend from without into the rectum. It advances slowly over a large area, cicatrizing at one point while it invades another. It remains auto-inoculable throughout, is apyretic, and only slightly painful. Lymphatic engorgement does take place, but the glands do not usually suppurate. The destruction of tissue is not usually very deep, but sufficiently so to involve the submucous and sometimes the muscular walls of the rectum. Were this not the case, there would never have been any question as to its producing stricture. Ulceration involving the mucous membrane alone leaves no trace or contraction after it has healed. The contraction, thickening, or fibroid deposit is in the deeper tissue, and not in the mucous membrane. Much argument and time have been consumed upon the chaneroid as a cause of stricture. Extreme views have been taken upon both sides, some holding that it is the only venereal cause of stricture of the rectum, others that it never occasions stricture. No one has offered any proof that simple chancroids of the anus and perineal re-

gion ever become the cause of stricture, except by producing reflex contraction and consequent atrophy of the levator-ani muscle, as described by Mr. Cripps; but Van Buren says, "I have seen chancreoids at the anus become phagedenic and extend into the rectum, and have verified at a later period the existence of stricture of the rectum from cicatrization, as there was every reason to believe, of this same ulceration" (Lect. upon Dis. of the Rectum and Anus, 1881, p. 237).

As it would require much repetition of what has already been said on the subject of stricture, under the head of Syphilis of the Rectum and Anus, it is thought best not to enter into the discussion here. Suffice it to say that the weight of authority seems to sustain the view that stricture of the rectum may be produced by phagedenic chancreoids or by chancreoids with much inflammation within the rectum.

Treatment.—In the treatment of phagedenic chancreoids, both a local and constitutional condition confronts us. To succeed, we must attack it at both these points. In the acute variety the parts should be kept as clean as possible, the pus cavity should be evacuated, washed antiseptically, and drained as soon as it forms.

Hot antiseptic poultices should be frequently applied, to encourage the circulation in the parts and assist in throwing off the sloughs. The temperature should be controlled by cold baths or antipyretics, and iron and quinine should be freely administered. In short, the principles of antiseptic surgery should be applied without reference to the peculiar chancreoidal virus.

In the chronic form there seems to be a lowered vitality of the parts, which makes them unable to resist the ravages of the disease, so that only a strong barrier of healthy granulation is able to check its march. Mild cauterizing agents, such as nitrate of silver, sometimes suffice to check it, but frequently more radical measures are called for. Nitric or chromic acid, caustic potash, or, as a last resort, the actual cautery, will sometimes be necessary. Every point in the base or circumference should be touched with the cauterizing agent, and the principles of antiseptics applied here as above. If the ulceration be largely within the rectum, it will be very difficult to reach it with the Paquelin or actual cautery, and it will be best to confine ourselves to the acids and to frequent lavements.

One can not be too careful of the condition of his patient before applying the cautery in these cases. I have seen a patient die from shock within two hours of the application of the actual cautery to a phagedenic chancreoid. I believe the condition is essentially a nerve exhaustion affecting the trophic centers, and before we adopt such radical measures we should give our patient the advantage of rest in bed, strong nerve tonics, good food, electricity, and massage. Under this treatment chancreoids

will frequently cease to advance, whereas they had gone steadily on before in spite of cauteries and astringents. The surrounding parts should be carefully protected and the dressings changed frequently to prevent auto-inoculation. Sometimes even these radical measures fail, and recourse must be had to a surgical operation, as in the case reported by Maclaren (Edinb. Clin. and Pathological Jour., 1883, p. 697). It was the case of a woman with "serpiginous phagedenic chancreoid ulceration," of eight years' standing, which had been cauterized and treated in the ordinary way a number of times, but without material improvement. It began in the vagina, spread over the labia to the perinæum and posterior anal groove, but did not ascend into the rectum. Her cure was accomplished by scraping off the granulations throughout the ulcer, paring, dissecting up, and bringing the edges as nearly together as possible by button sutures, at the same time administering strong tonics and regulating her diet. It was noticed in this case that contact of the menstrual discharges with the parts that had already healed would cause them to break down again. The vagina was therefore tamponned, and kept so during her monthly periods, until some time after recovery. This indicates the necessity of protecting these ulcers from all irritating discharges, and also the possibility of checking their advance by clean-cut dissection of their edges. If such can be done it would certainly be better surgery, less painful to the patient, and not so likely to produce shock or leave a contracting cicatrix as the cautery.

Complications.—Chancreoid of the anus and rectum may be complicated by true syphilitic chancre and by other syphilides. The dual sore presents no characteristic features at first. A typical chancreoid may develop and proceed in its regular course almost to cicatrization, when suddenly it will enlarge at its base, become indurated, and present all the characteristics of true chancre. At the same time this sore continues to secrete more abundant pus than a chancre, and remains auto-inoculable. Nevertheless, it contains the germs of syphilis, and eventually produces the constitutional manifestations thereof.

When they are complicated by later syphilides the diagnosis is very difficult. Mucous patches and syphilitic ulcerations may occur about the anus and rectum, and so much resemble chancreoid ulceration that it is impossible to distinguish between them. Inoculation may prove the existence of chancreoid, but it throws no light upon the syphilitic element in the case, and unless there be other evidence of the constitutional disease we should treat such sores as simple chancreoids, being constantly on the alert to discover any signs of systemic invasion.

Fistulæ of various forms may be found in chancreoid ulcerations of the rectum and anus. We have already alluded to the short fistulous tracts leading through the mucous folds from one sulcus to another, and

to the complete and incomplete fistulas complicating phagedenic chancroids within the rectum. There yet remains another and more frequent form seen with chancreoid ulcerations of the margin of the anus. These are small submucous fistulas running upward for an inch or more along the line of the columns of Morgagni. They seem to be due to the chancreoid virus destroying the submucous cellular tissue, while the mucous membrane resists its invasion. They may be complete or incomplete. The latter is more frequently the case, and unless the little fissurelike chancroids are examined carefully with a very fine probe, these little fistulous tracts are liable to be overlooked. In such cases their continuous discharge keeps up the ulceration below in spite of all our treatment. It is a question in such cases whether a surgical operation is justifiable, seeing that it exposes a fresh wound to the chancreoid pus. My practice has been to lay them open thoroughly and cauterize them with ninety-five per cent carbolic acid. The results have been uniformly good, but my experience is limited, and if the patient showed the least tendency to phagedena I should try the cauterizing agents, applied by a fine probe, before cutting. There is no danger of incontinence in these cases, for even in the phagedenic form the fistulous tract usually, and in the other forms always, passes between the mucous membrane and the sphincter muscle.

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